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ORIGINAL ARTICLES.

TECHNICAL ERRORS IN THE USE OF RUBBER GLOVES.¹

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ABOUT five or six years ago the question of the use of some form of glove to be employed in operative manipulations was revived. While not a new proposition, the discussions aroused at that time were listened to with much interest by American surgeons and particularly by those in New York. As is always the case in the problems of the medical profession, there were numerous arguments advanced by the opposing factions, although the great majority recognized the immense superiority of the glove over the naked hand from the standpoint of asepsis. There was, though, much division of opinion as to the kind of glove to be worn, the method of use and whether or no the surgeon's skill was handicapped.

It would not be of value to review these arguments now, but it is of interest to note that eight years ago there were but very few operators in this country who made any attempt whatever to wear gloves as a routine during operations. At that time the practical use of gloves was limited to occasional instances as a self-protection when operating on highly infectious cases. Now, on the other hand, the majority of surgeons look upon the use of gloves as much a matter of course as any of the rest of our aseptic technics.

The consensus of opinion is also in favor of a glove made of pure impervious India rubber and a gum glove is the kind almost universally adopted.

The writer does not wish to reiterate the arguments advocating the use of rubber gloves, for he assumes their value is taken for granted and proven. He wishes, however, to point out the technical errors in the use of rubber gloves, because it is possible to witness many surgical operations where several people are employed and see gross errors of technic in the manner of using gloves; errors not so much of carelessness, but of lack of instruction and thought on the subject. This applies particularly to the internes on our hospital staffs and nurses. We assume that the surgeons-in-chief have studied the subject and errors on their part we ascribe to carelessness, but the juniors are receiving their training and the details of instruction should not be neglected. Their thought and power of logic should be waked so that a correct routine becomes a matter of almost unconscious habit. To more thoroughly eradicate the errors, it would be wise to

rehearse the purposes the gloves serve in advancing the cause of asepsis.

Foremost it is impossible to assume, beyond all question, that one can by the use of antiseptics prepare the hands of all persons employed in an operation, so as to be confident that each and every hand is sterile for each operation. Of course, many times some of the hands are aseptic, but one cannot be sure that all are invariably so.

Gloves of pure rubber can be unfailingly rendered aseptic by boiling. Another point of greatest value is that impervious gloves preclude the possibility of exfoliations and detritus, from the hands, entering the surgical wound. A third point is that a smooth surface like a rubber glove can be more readily freed of coagulated blood and other materials than can the rough skin of the hand. The first argument in favor of the use of gloves is the one which the writer believes is most frequently set at naught by the careless manner in which the gloves are drawn on the hand. For example, the surgeon washes his hands in the most thorough manner, rinses them in various powerful antiseptics, according to his fancy, dries his hands on a sterile towel and is now ready for his gloves. Are his hands sterile? Does he know it for a fact? If so, he is foolish to go to the trouble of wearing gloves. On the other hand, does he doubt the asepsis of his hands? Is he credulous? If so, note how he vitiates his technic by his manner of putting on the gloves. Over and over again, by those who should know better, I have seen it done as follows: The gauntlet or wristband of the left glove is seized in a generous grasp by the right hand, and the left hand pushed into the gloves as far as possible; then with the naked right hand the finger tips of the left glove are stroked into place and the glove nicely adjusted. The right glove is now grasped by the left hand, already clothed, and the naked right hand introduced and the glove drawn into place, usually at the expense of dragging the left gloved thumb over the naked right hand and wrist. The surgeon now feels ready to begin his work or possibly deems it wise to rinse off his gloved hands in some sterile solution.

Another favorite method of putting on gloves is to throw several pairs of freshly boiled gloves into a bowl of bichloride of mercury solution or some similar antiseptic liquid. The surgeon, after thoroughly washing his hands as before, proceeds to draw or rather to float onto his hands the gloves lying in the bowl. During these manipulations he splashes the solution over the naked forearms and hands, the solution in turn bathes the gloves and smears over their outer surface, epithelium, etc., washed from the skin. The foregoing errors in technics are perfectly ap-

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parent when they are brought to our notice, and that they are errors in fact and not hair splittings must be conceded by all who admit the truth of the first and most important reason for wearing gloves, namely, the uncertainty of being able to sterilize all hands every time for all operations.

If one accepts the above as a fact, and I think nearly all up to date surgeons do, what possible excuse can there be for allowing the discredited and suspected hand to touch and rub up against the outside of the gloves so carefully prepared? If the surgeon adopts gloves, he places himself in the ranks of those who believe that the hand cannot infallibly be sterilized. If he then puts on his gloves as I have described, he must be a traitor to his beliefs. Successful operative results in spite of these errors, do not nullify the argument. We see many perfect healings after operations where gloves were not worn, but the element of possibility of wound infection in the case of the naked hand has been proven by laboratory tests to be high and practically nil with the sterile glove. Why, then, place on the face of the glove the very material we so eagerly strive to imprison within the glove?

Another objection to putting on gloves that are immersed in some liquid, is the constant dripping from the wrist of the water imperfectly confined by the fingers in the interior of the glove. This water may have been lodged at the finger tips for some time and after having macerated and bathed the skin, a thoughtless change of level of the hand allows this impure liquid to escape at the wrist and in all probability to fall into the wound or its immediate vicinity. The same is true where a torn finger tip is used. The whole glove acts as a funnel, the torn or tipless finger serving as the small end to lead with unerring aim the sweat, detritus, etc., of the whole hand into the wound.

The actual preparation of the gloves is often very carelessly done and unless they are simply picked from the boiler with a sterile instrument and handed hot and wet to the surgeon there are many chances for error in their preparation by thoughtless and imperfectly instructed persons.

The writer believes that the best and pleasanter use of gloves comes from putting them on dry with sterile starch, or lycopodium as a lubricant. In order to have them perfect the writer prepares his gloves in the following manner: A wide-mouthed bottle filled with pulverized starch and provided with a piece of gauze tied over the mouth in a single layer, is sterilized in a live steam sterilizer. At the same time several towels are sterilized by live steam in the usual manner. The gloves are then turned wrong side out, placed in a wire cage and submerged in clean water in the ordinary instrument boiler. Care should be taken that all of the glove is filled with water and the air driven out. Two pair of long dressing forceps or sponge holders should be put into the boiler with the gloves. The gloves are allowed to boil for from five to ten minutes, they are then taken from the cage and allowed to drain hastily. With the sterile forceps the gloves are placed on one

of the sterile towels spread out flat and another sterile towel laid over them. If all the free water has been allowed to drain from the gloves, a little stroking and patting of the upper towel will thoroughly dry the outer surface (really the inside, for the gloves were turned wrong side out) in a few minutes. The upper towel is then turned back and the gloves, both back and palm, thoroughly dusted with the sterile starch from the bottle.

We are now ready to turn the gloves right side out. With one pair of forceps the edge of the wristband is lifted and the other pair of forceps introduced into the glove until the blades can grasp the web between the middle and ring fingers; by drawing on the interior pair of forceps and turning the cuff over with the other pair, it takes but a moment to completely reverse the palm or hand portion of the glove. The neatest way to reverse the fingers is to grasp two diametrically opposed points of the edge of the wristband with the two pair of forceps, and then twirl the glove two or three times about its transverse axis; in so doing one closes the orifice of the glove and imprisons some air in the palm. Lay the glove with the orifice still sealed on a sterile towel, and pressing on the balloon part of the glove with another sterile towel, the compressed air causes the fingers to be everted with a rush. The gloves are next dried on their outer surface by again stroking and patting with a sterile towel until they are perfectly dry. They are now placed in a sterile towel with a piece of sterile gauze about four by eight inches laid between the gloves, another piece of gauze laid on top and the towel folded over and pinned. By this method of preparation the gloves have only come in contact with sterile towels, sterile forceps and sterile starch powder. The inside is well lubricated, the outside is perfectly free from powder and as the gloves were perfectly dry when put away, they can be kept several weeks without deterioration.

To put on the gloves for use, the writer thoroughly cleans his hands and dries them on a sterile towel. The package of gloves is opened, one of the pieces of gauze laid in with the gloves is picked up and with it as a protector the edge of one glove is seized and the other hand thrust into the glove. The gloved hand picks up the other glove, using the second piece of gauze and the other hand is clad. The pieces of gauze prevent contact of any part of the naked skin with the outer surface of the glove. The dry starch serves as an excellent lubricant and if any adjusting of the finger tips is necessary, this is not done until both hands have been clothed. The whole procedure is very rapid and offers no excuse for a break in technics, and a little thought on the subject will, after one trial, make one perfect.

Let us then properly prepare our gloves, properly put them on and use only such as are perfectly watertight. The gloves are sterile only so long as we keep them so; they have no inherent virtue, no antiseptic power. One would think on seeing the carelessness with which gloves are handled

that they had properties similar to radium, emitting powerful bacterioidal rays and were capable of neutralizing the grossest negligence on the part of those who abuse them.

INTERSTITIAL GINGIVITIS OR SCORBUTUS.¹

BY EUGENE S. TALBOT, M.S., D.D.S., M.D., LL.D.,
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A DISCUSSION before the British Epidemiological Society, February 19, 1904,² while seeming to involve the issue of treatment and prophylaxis really involved the issue of diagnosis. This issue is likely to be frequently raised since the American acquisition of colonial possessions requiring garrisons, and since the acquirement of the protectorate over the Panama Canal.

Mayer Coplans of the British army medical service found that scurvy appeared among a population which had been maintained on government rations of good quality. This population consisted of burghers in "concentration camps," European soldiers, natives attached to the British army and to the civilian repatriation department.

Each concentration camp contained about 5,000 persons, 48 per cent. being children under twelve years of age, and among adults the women were to the men as three to one. Inclosed by barbed wire the camps, though open and airy, were securely isolated. The conditions being identical the varying incidence of scurvy was remarkable. Between March, 1901, and January, 1903, with no cases at Standerton or Volksrust, there were one hundred Europeans and one native attacked. Among the soldiers at Standerton and the 22,000 European patients admitted to the hospital there was but one; among the natives in the service of the troops there were attacked 32 per cent. of 400 muleteers, 22 per cent. of those attached to the Hussars and the Royal Artillery, 87 per cent. of the scavengers engaged in removing carcasses of animals, 17 per cent. of the porters and about 50 per cent. of the muleteers in the employ of the repatriation department.

The heaviest incidence of scurvy was after the close of the war, and when all restrictions on food had been removed. In fact, it had no relation whatever to the food, but was almost everywhere directly in proportion to the neglect of cleanliness, of which the natives had not the most rudimentary notions, especially as regards the hygiene of the mouth. Even the outbreak among the burghers at Middleburg followed overcrowding and neglect of sanitation. As to treatment, the food, though mostly preserved and tinned, was good, but many refused the harsh sour lime-juice. Dietetic treatment was very successful; rapidly so, if accompanied by mechanical cleaning of the teeth and gums with continued use of antiseptic washes, though more slowly without.

A. E. Wright said filthy habits were not peculiar to the Kaffirs and were not always accompanied by scurvy, which occurred in the nurseries

of the rich and in nursing homes. Scurvy was essentially an acid intoxication, a reduction in the alkalinity of the blood, which could be observed long before the grosser manifestations, alike in the adult and infantile forms. A large proportion of the troops returning from South Africa were scorbutic in the latent stage. R. H. Hirth called attention to the low values of the dietaries given, few exceeding two thousand kilocalories, or barely enough for the body work. The ash of tinned milk was often acid instead of alkaline. In one expedition he had had to condemn 30 per cent. of the milk. A large proportion of British troops on return from "little wars" were more or less scorbutic. J. Land Notter said, the Kaffirs, though supplied with good food, preferred putrid meat or entrails of dead animals.

K. B. Goadby had not seen any scurvy at the Dreadnought Hospital, but had met much pyorrhea alveolaris, a disease endemic and occasionally epidemic in West and Central Africa, the Transkei, Philippines and other places. This condition of the gums and the rapid recovery of the patients under antiseptic measures resembled that found in scurvy. H. T. Bulstrode called attention to the fact that the great naval surgeon, Lind, had, one hundred and fifty years ago, rejected the belief in specific action of lime-juice. E. F. Willoughby was surprised at the absence of reference to the theory of Tonk, of Christiania, namely, that scurvy was no more or less than a chronic ptomain poisoning, which he considered the only one that explained all the phenomena of scorbutus.

Polar expeditions led to the conclusion that a diet of fresh, even raw meat, without any fruit or vegetables whatever and associated with hardship, dirt and misery, or one consisting entirely of tinned, preserved and sterilized foods of the highest quality, but with no fresh food, animal or vegetable, did not produce symptoms of scurvy, while scurvy appeared when along with potatoes, etc., and daily doses of lime-juice, the bulk of the food consisted of ordinary salt beef or pork. Until the recent Antarctic expedition from that of Nordenskjöld in the Vega none had been attacked by scurvy except that of Jackson, whose men remained on board the ship, where they had lime-juice, potatoes, etc., but refused the coarse, even "gamy" bears' flesh on which alone the exploring party subsisted. All were attacked with scurvy, two, indeed, dying.

The Laplanders of Finland bartered for farinacea, etc., but ate their fish putrid by preference and suffered much from scurvy. Coplans pointed out in reply that it required months for its development, for the members of the corps that suffered most were recruited in their homes in October and the corps was dissolved in December, the disease breaking out soon after arrival in camp. Recovery followed rapidly on purely local treatment in the way of buccal antiseptics without any attempt to influence the blood.

The term "scurvy" frequently employed in the discussion is applied to the disease in the mouth/

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² The Lancet, London, March 5, 1904.

especially in relation to the gums. Nothing is said in regard to other symptoms and the logical inference is that such were not present.

In scurvy there is inflammation and bleeding gums. The gums puff up, thicken and bleed easily. The teeth become loose and sore upon mastication. A disagreeable odor comes from the mouth. Salivation or ptyalism results from irritation from the teeth as well as scorbutic anemia. The patient is languid or tires, perspires freely upon exertion, has shortness of breath and palpitation of the heart. The face is ashy gray, becoming paler each day. Hemorrhage takes place in different parts of the body, especially beneath the skin, in the muscles and beneath the periosteum as well as in the joints. This often gives considerable pain and sometimes causes inflammation with resultant pus infection. Occasionally hemorrhage takes place in the internal structures. The temperature varies and both febrile apyretic states occur.

The symptoms observed in interstitial gingivitis are connected with the gums and alveolar process. There are no constitutional symptoms. This disease was formerly known as pyorrhea alveolaris because the disease was not recognized until pus was observed about the teeth. It exists for years before pus is noticed. All the teeth may be lost without pus. Since the inflammation is deep-seated in the alveolar process as well as in the gums, I have designated the disease interstitial gingivitis. The interstitial gingivitis due to scurvy, drug or self-poisoning has the same pathology.

As part of the pathology, the character of the structures involved must be taken into account. In man's evolution, the face, jaws and teeth are diminishing for the benefit of the brain, under the law of economy of growth resultant on the struggle for existence between organs. Jaw recession is well illustrated in the American negro.

In man's evolution from the lower vertebrates, he has acquired two sets of teeth. Some of the lower vertebrates possess continuous sets. These are used for awhile, shed and new ones take their place. Man sheds the temporary set early in life. Should he live long enough the permanent set must be shed. This result is brought about by a process which takes place in the jaws of every individual, and has been designated osteomalacia or senile absorption.

Through the struggle for existence between organs and the eruption and shedding of the teeth, the alveolar process is a doubly transitory structure. Being an end organ it is a most sensitive structure easily affected by disease, drugs and faulty metabolism.

The age at which senile absorption begins depends upon the degree of normality of the individual. If he be neurotic or degenerate, or have inherited or acquired a cachexia or taint, this process of inflammation and absorption commences as early as the eighteenth or twentieth year. The process of shedding the temporary teeth and the eruption of the permanent teeth is

a similar one, but the alveolar process holding the permanent set of teeth has not developed.

Interstitial gingivitis attacks every alveolar process after it has its growth, or about the twenty-sixth year. The severity depends entirely upon the degree of balance between the organs, including proper elimination.

At forty to forty-five, the fourth period of stress or period of evolution, the disease is quite active. From this time absorption is rapid and loosening of the teeth later occurs, even in comparatively healthy individuals. If the patient be constipated, have kidney lesions, skin or lung disease, so that any one of the eliminating organs are not doing the work, auto-intoxication results. The inflammation of the alveolar process is markedly increased. Other than improper elimination, no morbid condition will produce interstitial gingivitis, as surely as intestinal fermentations. Through want of proper secretion, starchy food is not properly digested and fermentation results. Gases accumulate in the intestines. The urine is excessively acid. Indicanuria is present with low specific gravity and urea is scantily excreted. None of these symptoms are severe, but merely render the patient uncomfortable. The physician rarely considers them of moment. They play havoc, however, as a result of auto-intoxication.

Auto-intoxication due to faulty metabolism, changes in climate and surroundings causing a want of proper adjustment of the excretory organs, no doubt produce the type of interstitial gingivitis before designated as "scurvy." The same results have appeared with the American soldiers in Cuba and the Philippines, and engineers and workmen building railroads in high altitudes in Switzerland. People going from a mild climate to an extremely hot or cold one, or vice versa, with or without change of food, do not readily adjust themselves to the new environment and the underlying states of interstitial gingivitis develop. Hygiene in Panama will be needed along these lines, since interstitial gingivitis increases, very disastrously, the morbid conditions to which in part it owes its origin.

Constitutional secondary consequences of interstitial gingivitis could, as Goadby evidently surmised, mimic scurvy, even as to the hemorrhages and here antiscorbutic treatment would be useless. It must be remembered that depression plays a part in this direction through its influence on elimination and alimentation. The defective metabolism of the insane, independent of diet produces hemorrhagic states. The first test of all these states is the gums, and here treatment with proper stimulus of elimination will aid assimilation and remove these "scorbutic" tendencies.

Influenzal Gastro-enteritis.—Physicians in German-town report an epidemic of gastro-enteritis that is considered to be influenzal in origin. Children up to four years of age are attacked and there is usually accompanying affection of the respiratory passages. In addition to the diarrhea, vomiting and fever are present. The kind of milk or other diet used seems to bear no relation whatever to the onset of the disease.

SOME WEATHER OBSERVATIONS IN THE ADIRONDACKS.¹

BY LAWRASON BROWN, M.D.,
OF SARANAC LAKE, N. Y.

THE weather observations upon which this paper is based were taken for about five years in the village of Saranac Lake, on a partially protected slope of about 1,550 feet elevation, with a western exposure. During the remainder of the time the observations were made at the Adirondack Cottage Sanitarium, situated one-half mile north of the village of Saranac Lake on a hill-side with a northeastern exposure, at an elevation of 1,625 feet.

The Adirondack Mountains lie in the northern part of New York State between latitude 42° 30' and 44° 30', and longitude 74° and 75° 30' W., covering roughly about 125 miles square. The average elevation is 1,600 feet, with peaks 1,000 to 3,000 feet higher, extending in general toward the southwest and northeast in several irregular ranges. The soil is composed chiefly of light sand, very porous, and glacial drift and moraines are common. Except along some of the more frequented roadways the whole region is rather densely wooded. Deciduous and evergreen trees occur in about equal proportions. A majority of the peaks and lesser elevations are wooded to the top and with each season present varying hues that render the landscape beautiful.

The whole region abounds in lakes and streams, which form one of its chief charms. Several rivers rise from these lakes, among them the Hudson, the Raquette, the Saranac, the St. Regis and the Beaver. The greater part of the shores and banks of the lakes and rivers are wooded to the very water's edge. Most of the

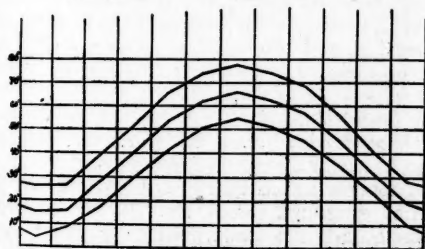


CHART 1.—*SOME MONTHLY MEAN OF MAXIMUM, MINIMUM AND MEAN TEMPERATURES AVERAGED FOR TEN YEARS*

lakes are small, but the Saranac lakes (upper and lower), Tupper Lake, Lake Placid and a few others, have a length of from five to ten or more miles. An idea of the frequency of the lakes and streams is conceived when it is known that one can start at Fulton Chain and go to Saranac Lake almost entirely by water, a distance of 100 miles or more, making short portages or "carries" between some of the lakes. The Adirondack region is well protected from the ocean by the White and Green Mountain ranges. Lake Ontario modifies the western slope, while the

northern is under much the same influences as the St. Lawrence valley.

The Temperature of the Atmosphere.—The mean annual temperature for Saranac Lake was 41.57° F. for the ten years ending December 31, 1903. The monthly means varied from 14.98° for January to 66.24° F. for July, and are to be seen on Chart 1, as follows:

January	14.98°	(15)
February	15.62°	(16)
March	28.14°	(28)
April	40.65°	(41)
May	53.63°	(54)
June	62.50°	(63)
July	66.24°	(66)
August	62.84°	(63)
September	57.24°	(57)
October	45.67°	(46)
November	32.09°	(32)
December	19.23°	(19)

The mean maximum for this time was 52.47° (52) and the mean minimum 30.67° (31). The mean daily range was 21.8 (22), being greatest in the summer. January and February are the coldest two months with mean minimums of 3.98° and 4.76°. June, July and August are the warmest three months with mean maximums 74.23° (74), 77.86° (78) and 74.51° (75) respectively. The nights are always cool and it is rare that one does not require blankets.

The records show that during the period under observation a temperature of 90° F. has been recorded but 19 times, and during the last two years the thermometer has not reached that figure. On the other hand, on about 180 days each year 32° F. or less is registered. The highest recorded temperature is 95° F. on July 5, 1897, the lowest—38° F. on February 16, 1896, July is the warmest month and January the coldest.

The solar temperature has not been recorded.

Atmospheric Moisture.—The hygrometric state of the air has not been investigated. Last fall a sling psychrometer was used for one month, September 26 to October 26, at 8 A.M., 1 P.M. and 6 P.M. The average readings for this month were as follows:

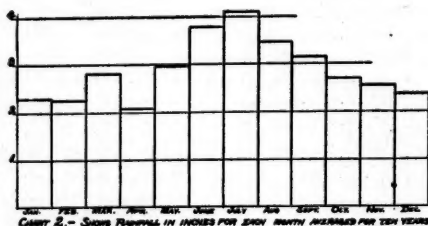
8 A.M.	78.4 per cent.
1 P.M.	61.4 per cent.
6 P.M.	76.0 per cent.

Precipitation.—The average annual precipitation for ten years was 34.55 inches. The mean monthly precipitation was 2.88 inches and varied from 2.07 inches in April to 4.12 inches in July. The mean monthly figures are as follows:

January	2.29 inches	(2¼)
February	2.25 inches	(2¼)
March	2.80 inches	(2¾)
April	2.07 inches	(2)
May	2.95 inches	(3)
June	3.80 inches	(3¾)
July	4.12 inches	(4)
August	3.48 inches	(3½)
September	3.15 inches	(3¼)
October	2.70 inches	(2¾)
November	2.56 inches	(2½)
December	2.38 inches	(2½)

¹ Presented to the American Climatological Association, June 2, 1904.

The average yearly snowfall was 90.74 inches. A trace of snow fell in September, nearly an inch in October, 11 in November, 13 in December, 21 in January, 21 in February, 16 in March, six in April, and 1½ in May. From this it is seen that with the exception of June, July and August, snow falls every month, and averages for the year slightly more than 7½ feet. Con-



sequently one-quarter of the precipitation (exactly 26 per cent.) is in the form of snow. The lakes and ponds are frozen from the latter part of November to March and at times the ice does not break up until May. These frozen waterways are used extensively for driving and hauling in winter.

It is of interest to note that April is the month with least precipitation (2.07) and July with the greatest (4.12 inches).

There is 0.01 inch or more precipitation on 145 days each year, or on twelve days out of each month. The average number of rainy and snowy days per month is as follows:

January	14.0	(14)
February	12.6	(13)
March	12.8	(13)
April	10.0	(10)
May	11.7	(12)
June	11.1	(11)
July	13.2	(13)
August	11.9	(12)
September	9.6	(10)
October	11.5	(12)
November	12.7	(13)
December	14.2	(14)

During December, January and February the precipitation is almost entirely in the form of snow. The number of rainy days in these three months are on an average about seven. During November and March, the snowy days (16) are nearly double the rainy days in number, while in April the number of snowy days (3) are considerably less than half the number of rainy days.

From these figures we gather that from the first of November to the first of April there is 0.01 inch or more precipitation on sixty-six days. Of these sixty-six days, rain occurred on fifteen days and snow on fifty-one days. Many of the rainy days were partly snowy.

The porous nature of the soil enables the rainfall to be rapidly absorbed, and many walks and drives are much pleasanter just after a rain. There are only a few clay beds in the Adirondacks and throughout this whole region there is

but little soil of such a character as to retain moisture. A region of numerous bodies of water in the form of mountain lakes, with rocky shores and sandy beaches, differs materially, climatically considered, from a similar region with a heavy soil, retaining moisture.

Fogs and mists vary much with local conditions. In some localities they occur rarely; in others, along the rivers and on the lake shores, they are of more frequent occurrence. However, even where they occur, they are rarely seen except in the early morning hours. In the intense cold of winter, mists are seen occasionally along the unfrozen parts of the river.

The barometer readings for thirteen months show a mean monthly average of 28.412 inches. The highest monthly mean was in June (28.55), the lowest in February (28.22). The readings were taken indoors at an elevation of 1,550 feet.

September	28.521
October	28.377
November	28.405
December	28.460
January	28.331
February	28.224
March	28.373
April	28.400
May	28.460
June	28.547
July	28.435
August	28.412

The Sky.—The average number of clear days is 121.9, or 10.2 days per month. They are distributed as follows:

January	8.8
February	7.6
March	8.6
April	11.0
May	13.0
June	13.3
July	11.2
August	12.0
September	12.7
October	10.7
November	6.7
December	6.3

The number of clear days was larger than I supposed and compares very favorably with most "cool, moist climates."

The number of cloudy days slightly exceed the number of clear days and are 128.9 days per year. They occur as follows:

January	14.1
February	12.6
March	12.2
April	10.5
May	8.4
June	6.0
July	6.3
August	5.7
September	8.2
October	12.4
November	15.4
December	17.1

From this it is seen that the number of cloudy days is quite high, but on the other hand the

number of partly cloudy days is very small. The greatest number of cloudy days occur in November, December and January. The partly cloudy days number 114 and vary from 7.5 days in December to 13.5 days in July.

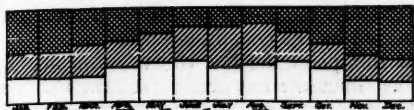


CHART 3.—PERCENTAGES OF CLEAR (BLANK SPACES); PARTLY CLOUDY (SINGLE HATCHING); CLOUDY DAYS (CROSS HATCHING).

The average percentage of possible sunshine for the last few years is 46.2 per cent. and is distributed as follows:

January	25.8
February	35.7
March	46.0
April	55.5
May	71.8
June	46.2
July	55.0
August	46.3
September	65.1
October	36.2
November	41.3
December	29.7

These records cover too short a time to be of value. The high percentage for May was due to the fact that last year a severe drought extended throughout the spring months.

Temperature alone, as is well known, does not express fully the effect of local conditions on persons of varying temperament. Coming to the Adirondacks regularly in summer from any of the cities of the Atlantic Coast one is impressed by the coolness and the amount of energy one feels like expending. In nearly all cases warmer clothes have to be worn. Permanent residents of the region seem to feel a slight rise of temperature in the summer much more than the visitors.

The purity of the air can almost be said to be a *sine qua non* of a pulmonary health resort. Many resorts, no doubt, owe much of their beneficial influence to this quality of the air. In general, the greater the elevation, the greater is the purity of the air. But other factors have to be considered, and among these are the density of the population, smoke, the velocity and frequency of the wind, and the condition of the soil. The first point is well illustrated by the following figures:

In London the number of solid particles in each c.c. of air is from 80,000 to 210,000, while that of the western highlands of Scotland is only 16.

The amount of dust in the air and *ceteris paribus*, the number of micro-organisms, depends largely upon the wind and the condition of the soil. The greater the velocity and frequency of the wind, the greater the quantity of the dust. For this reason forests which break the winds and which prevent them from reaching the soil are very valuable in preventing dust. Snow,

too, is most valuable for this reason, for when the ground is covered with snow, there can be little or no dust. Rain, as has been often stated, is valuable both for precipitating impurities in the atmosphere and for preventing dust. No one, I think, will deny that the atmosphere in the Adirondacks with its 145 days of precipitation is well cleansed. From what has been said it can be easily seen that the greater part of the Adirondack region is wooded and has its climate modified accordingly. Further, the ground is covered with snow for a little over four months each year. The prevailing winds in the region about Saranac Lake are from the west, but with the exception of a few days in the spring and fall the wind causes little inconvenience to one leading an outdoor life. In summer on the eastern shores of the many lakes the cool breezes over the water modify the midday temperatures and are always refreshing, making the shores several degrees cooler than elsewhere in the same region.

In conclusion, it may be said that: (1) The climate of the Adirondack mountains is cool and moist during seven months of the year; cold and dry during five months. (2) The entire region enjoys freedom from dust and disagreeable winds. (3) The number of clear days is small, the number of cloudy days excessive, and the number of partly cloudy days much below the general average.

In closing, I wish to express my thanks to Dr. E. R. Baldwin, who recorded the weather observations for five years, and to Dr. Dutton and Mr. C. W. Mills.

Adirondack Cottage Sanitarium.

THE BIOLOGICAL INTERPRETATION OF CANCER.¹

BY ALEXANDER SPINGARN, A.M., M.D.,
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THE cellular theory of Virchow removed pathology from the domain of mystery and placed it within the realm of natural phenomena. It is to the science of biology that the students of disease now look for the laws that govern morbid processes. Can biology furnish a satisfactory explanation of cancer? This question is directed to the botanist and zoologist rather than to the pathologist and clinician.

The founder of modern pathology attributed disease to perturbations of the normal cells of the body. The bacteriological school, headed by Koch, have indicted the germ as the main culprit responsible for those changes in the activities and relations of cells which are recognized as disease. Hence a host of workers are looking for the special parasite of cancer.

The quest of this parasite, encouraged by success in cognate fields, must be lauded. Yet even if this attempt be successful, the discovery of the cancer parasite will no more explain the real cause of this disease than the bacillus of Koch reveals the genuine cause of tuberculosis. Prud-

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den has ably emphasized the importance of viewing the microbe as the exciting and not as the efficient cause of disease.

In seeking the explanation of various natural phenomena pertaining to life, an appeal must be made in the long run to broad general biological laws. Of these, one which has unlocked many a mystery of science is the modern doctrine of evolution. Let this be applied to pathological as well as physiological phenomena, and in the present instance, to the problem of the origin of cancer.

The two important factors in evolution are heredity and variation, the latter including also the process of natural selection. These factors have been chiefly emphasized in the production of distinct types and species of animals. In no less degree have they been instrumental in establishing the form and type of the tissues and organs of the animal body.

The cancerous growth consists of the normal cells of the body, which have undergone an unlimited proliferation. Ribbert has beheld in this excessive multiplication of the cells an evidence of the loss of certain restraining factors whose influence is constantly felt in the normal body. As to what these restraining influences are or how they operate no suggestion has been made.

The real explanation of cancer should rather be sought in the laws that govern the growth and multiplication of cells. "If any one will tell me," says Prudden, "by what arrangement of cell mechanism, by what disposition of cell impulse, under what direction of heredity or environment, the various cells of the normal body go on growing, multiplying, taking on new forms and functions, framing new tissues, from the time the original cell ceases to be an egg and becomes an individual, until full maturity of the body is attained, if any one will tell me this, I say, and then tell me why at maturity this tissue growth ceases, why these new adventures in organ-forming stop and from maturity until the worn-out body is ready for the grave only those growths and replacements occur which are demanded by the exigencies of nutrition or accidental emergencies, I will agree to hand him back his lore as a fair clue to, if not an exhaustive exposition of, the origin of tumors."

The law of growth, so far as it is dependent upon the size of the cell, has been firmly established. The theorem of solid geometry that the surface of a sphere increases as the square of the diameter, while the volume increases as the cube of the latter, has been applied to the mechanics of the cell. As the cell grows its volume increases more rapidly than its surface. The nutrition of the cell depends upon its capacity to absorb. A stage is reached when the surface of the cell is incapable of absorbing sufficient nutriment for the cell-body, with the result that there is impaired nutrition, a weakening of the middle zone of the cell, a diminished resistance, with a resultant splitting along the weakened zone, which phenomenon is known as cell-division.

This process is therefore dependent upon the ordinary laws of physics and geometry. But the latter determine only the limits to which a cell may grow. The absolute size of a tissue or organ, however, is dependent also on another factor, namely, the power or extent of multiplication possessed by the constituent cells.

At this point the law of evolution may be applied. This law has determined the absolute size of the various organs and tissues. While those organs whose size was inadequate to serve the needs of the body have caused the individual to succumb in the struggle for existence, so also organs which had a tendency to attain too great a size have proved a disadvantage to their owner. In the evolution of the complex multicellular organism, with the increasing perfection of physiological division of labor, there has resulted a fine adjustment of tissue to tissue and organ to organ. The health of the entire body would be an expression of the harmonious cooperation of the mutually interdependent members of the vital community, and might be termed an organic equilibrium. The researches of Jacques Loeb have shown that each tissue depends for its health upon the chemical equilibrium of its immediate environment. For example, the normal muscular contraction and the normal rhythmic beat of the heart are each dependent upon the delicate balance of inorganic salts in the surrounding medium, the blood. If one or more of these salts be increased, diminished or removed, there results a disturbance or an arrest of function. In a similar manner the nice equilibrium of the entire vital mechanism may be disturbed or even destroyed by the incomplete or excessive development of any one of its component parts. For instance, an excessively large heart would lead to inordinate arterial tension with consequent arteritis and possible rupture of the vessel. A similar tendency to proliferation and hypertrophy in the various tissues would lead to embarrassment of function. A familiar example of unchecked growth of a particular tissue is seen in lipomatosis or obesity. And just as the pathological, diffuse accumulation of adipose tissue hampers the workings of the bodily machinery, so a localized fatty infiltration of a particular organ (*e. g.*, the heart), compromises its efficiency. Moreover, one must not overlook the fact that a tissue which has acquired excessive proportions is apt to undergo, as the result of the failure of the body to supply adequate nutrition, degeneration or necrosis. In this manner may be explained the atrophy following the various forms of muscular pseudo-hypertrophy, the failure of compensation in an hypertrophied heart and the ulcerative transformation of malignant neoplasms. In the organic community overgrowth of any of its members is fully as disastrous as deficient growth. In the throes of the struggle for existence each tissue or organ has approximated, within certain narrow limits of conformation and size, to its ideal, or so-called normal, type. Natural selection would, therefore, account for the limitation of the size of

the different organs and tissues, which limitation is perpetuated by heredity.

At the same time, while recognizing this result of natural selection, one must admit that under certain conditions there may occur an overgrowth of tissue, a purely physiological hypertrophy. This is of a compensatory nature, and of the numerous forms a few may be cited, as follows: Hypertrophy of the heart, consequent to valvular disease or nephritis; overgrowth of connective tissue in the arteries, resulting from excessive blood-pressure (Thoma); the overgrowth of muscles to meet the demands of excessive exercise; thickening of the epidermis from increased pressure; compensatory enlargement of one kidney, lung, or one cerebral hemisphere from absence or defect in the corresponding mate, etc.

The above examples show the plastic character of the vital mechanism, which unlike any other known structure, changes its size and power according to the demands made upon it. Structure and function may be mathematically expressed as the functions of a number of variables, such as use, environment, heredity, etc. "Life in all its forms," says Henry Maudsley, "physical and mental, morbid and healthy, is a relation; its phenomena result from the reciprocal action of an individual organism and of external forces; health is the consequence, and the evidence of a successful adaptation to the conditions of existence, and imports the preservation, the well-being, and the development of the organism, while disease marks a failure in organic adaptation to external conditions and leads to disorder, decay and death."

In this adaptive capacity of the individual tissues and organs is to be sought the secret of pathological hyperplasia. One may here allude to the conservative tendency displayed in connective tissue formation. The closing in and the final obliteration of a tuberculous cavity in the lung by connective tissue, is a familiar example. This conservative or protective tendency is again seen in those numerous forms of hypertrophy resulting from embarrassment of an organ or tissue. Thus results hypertrophy of the heart in adherent pericardium. The formation of callosities on epithelial surfaces exposed to constant pressure, is a case in point. If for any reason the cells of the tissues, as the result of some irritation, be prevented from exercising their proper activity, there is a tendency to increased cellular multiplication. This subject is closely connected with the fundamental problems of regeneration of cells and tissues. In his work "Regeneration," Morgan alludes to a phenomenon that most students of biology must have observed in the laboratory, namely, that starfishes sometimes replace one lost arm with two new ones. While it is true that in most cases the part which is formed by regeneration is identical with the part lost by mutilation, yet it would seem as if, in some instances, the forces, whatever they may be, that make for regeneration, are ever ready, upon the slightest embarrassment or injury of a part, to assert them-

selves with a momentum out of all proportion to the original loss. The application of this fact to the problem under discussion is plain. There are a number of protective mechanisms in the body which are probably closely related to the regenerative faculty. Thus the increase in the number of red blood cells that rapidly occurs when the individual ascends in a balloon or takes up his residence in the mountains, occurs in response to the deficient oxygenation attendant upon the rarefied air, the increased number of red blood cells enabling the body to get the normal supply of oxygen; in addition, each red corpuscle is larger. The erythrocytes are being constantly destroyed in the organism and constantly regenerated. Under normal conditions the power of repair proceeds at a rate which is just sufficient to keep the number of red blood cells constant or approximately so. Yet in response to the increased needs of the organism this regenerative capacity may be increased. It is conceivable that certain stimuli which have no relation to the needs of the body, might bring about this increased proliferation of red blood cells. The phenomena connected with the formation of cicatricial tissue serve to illustrate both the normal and the abnormal phases of regeneration. Thus, while the scar-tissue is ordinarily just sufficient to close up the wound and in this respect represents the normal type of regeneration, yet, under certain conditions not yet understood but probably consisting in abnormal irritants or stimuli, the cicatrix may become excessively large and troublesome, constituting what is known as keloid. The formation of exuberant callus in fractures is another instance of this same extravagant and riotous regeneration.

The leucocytosis that occurs in inflammatory processes is probably fundamentally akin to the above-described phenomena, being but an augmented and accelerated reproduction of white blood cells in response to bacterial and toxic irritants. This prodigal multiplication of leucocytes has been turned to good account by the organism in a protective way. The hyperplasia of the bone-marrow, spleen, and lymphatic glands, with the associated enormous leucocytosis that occurs in the various forms of leucemia, may be analogous to the above-mentioned types of unchecked and abnormal regeneration. It is quite possible that future investigations will show that the production of anti-bodies in the various forms of acquired immunity, is but a phase of the accelerated proliferation of elements normally present in the economy.

The formation of galls, tumor-like excrescences produced in plants by insect parasites, indicates regenerative phenomena analogous to those above mentioned. The presence of the insect stimulates the plant cells to multiply at an abnormally accelerated rate, with the result that a mass is formed which completely encapsulates the parasite. It is supposed that poisonous irritants secreted by the insect are the cause of this abnormal cellular growth. It is suggested by Darwin that possibly chemical compounds secrete-

ted by plants under changed conditions of life, may cause eccentricities in the growth of various parts of the plant, similar to those seen in insect-galls. This phase of the problem under discussion invites thorough experimental investigation.

The explanation of these forms of hypertrophy may be sought in the fact that when the cells of a tissue are incapable, as the result of some irritation, be it chemical, parasitic or mechanical, of doing the work allotted to them, then these cells will proliferate, in order to produce other cells, the activity of which will make up for the embarrassed function. The rôle that mechanical irritation or traumatism plays in the etiology of malignant neoplasms has not been overestimated. The possibility that chemical or toxic irritants, the result of faulty metabolism, may act as tissue irritants in this respect, must be considered.

August Weismann, in his fascinating book, "Essays on Heredity," speaks of the inherent immortality of the cell. The lowly animal organism, consisting of a single cell, endowed with the unlimited capacity to subdivide, knows not death. It is only the multicellular animal in which immortality has been restricted to the reproductive cells. Death is the result of natural selection. Possessing originally an infinite capacity to subdivide, the cells of the body have eventually acquired a finite existence, and the entire body itself has been doomed to death, as the result of the struggle for existence between the individual cells, as well as between the different animals. The cessation of life is an adaptation to the conditions imposed by the crowding of cells and animals, with the consequent reduction of the means of subsistence. The reason, therefore, why a particular tissue keeps on growing until it has reached a certain size and complexity, and then stops growing, is thus easily explained on the basis of an adaptation to the functional and nutritional needs of the living environment. But the tissue never forgets its birthright. Endowed with a capacity to grow which has been stilled by the needs of the organism, this capacity of the tissue is again awakened whenever anything tends to embarrass or limit the activity of this particular part.

"It is rather a matter of surprise," says Prudden, "that ever-changing, self-regenerating living tissue does not oftener go astray in its activities than that it only now and then should do so." May not the proliferative aberrations in cellular life be compared to the numerous examples of reversion to an ancestral type familiar to the student of zoology? The reversion in this case would be to the habits of the cells at the dawn of life, either of the race or of the individual, when self-multiplication was the most prominent phenomenon in cellular activity.

That there is some ground for believing in the atavistic origin of new growths is indicated by the recent researches of Farmer, Moore and Walker, reported to the Royal Society. These investigators detected in the depth of

malignant tumors certain peculiar cells which are exactly like those that are formed during the early stages of division of the germinal epithelium, resembling the latter in having but one-half the usual number of chromosomes in the nucleus. This observation does not necessarily confirm Cohnheim's hypothesis of the embryonal origin of tumors, namely, that certain displaced embryonal cells, when the conditions are favorable, are prone to multiply with all the energy characteristic of their prototypes, for the authors have not been able to cause the development of new growths by transplanting portions of ovarian or testicular tissue to different parts of the body. It indicates rather that in the course of the mitosis of highly differentiated cells, some of the latter, by a peculiar process of cell-division, may revert to the primordial condition of the cells in early embryonic life.

In discussing the proximate causes of reversion, Darwin states "that any change in the habits of life apparently favors a tendency, inherent or latent in the species, to return to the primitive state." If this is true of the entire body, it is probably also true of the constituent cells. That the highly differentiated somatic cells should inherit the remote ancestral traits of the undifferentiated germinal cells, in most instances, only during the latter part of the individual's life, is in line with some of the well-known phenomena of atavism. "Thus," says Darwin, "the calves of a hornless race of cattle which originated in Corrientes, though at first quite hornless, as they become adult sometimes acquire small, crooked, and loose horns; and these in succeeding years occasionally become attached to the skull." Other instances of the incidence of atavism during advanced periods of life are cited. What is still more interesting is the observation that frequently this tendency to reversion may become hereditary.

The question now arises, namely, how can one reconcile with the atavistic conception of cancer the hypothesis that the abnormal and excessive proliferative activities of the cells seen in neoplasms, are the result of changes in the environment, e.g., irritation. The explanation seems to be close at hand. All physiological manifestations occur in response to some external stimulus. Life is but a series of reactions of a collection of unstable compounds known as protoplasm to external forces. Every pathological manifestation is likewise to be attributed to some external stimulation. In the production of vital manifestations the play and counter-play of numerous forces must be borne in mind. Factors such as heredity, nutrition, climate, crowding, etc., all share in the elaboration of the finished living product. Would it seem so strange, therefore, that the normal, modest deportment of the bodily cells, in keeping within the strict limits decreed by the struggle for existence, should at times be upset by some new factor that disturbs the peace of the vital community? Just as a severe psychic cataclysm may transform the highly civilized individual into a

savage, so an unusual stimulus or a congeries of stimuli may excite certain bodily cells to assume the habits of their primitive ancestors. In cancer the stimulus may be a jagged tooth, a traumatism, a long-continued ulceration; it may be some chemical poisons originating in the wear and tear of the tissues, and only effective after years of accumulation (hence the incidence of cancer during and after middle life); it may be that the law of habit exhibited so powerfully in the life of the cells, decrees that when the units of protoplasm belonging to a certain lineage have frequently responded in the past to various stimuli by taking on an abnormal proliferative activity, then the cells of the same lineage will be prone to respond in a similar way in the future. Thus the rôle of heredity in cancer may possibly find its explanation.

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APPENDICITIS: PATHOLOGY AND SURGICAL TREATMENT.¹

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THE fascination of abdominal surgery and the brilliant results achieved stimulates our attention to the importance of appendicitis. As its etiology and pathology have been more closely defined, so has its treatment advanced, and the morbid specimens removed frequently afford an opportunity for interesting study.

It is axiomatic that no surgical procedure should be advised or adopted except there be a reasonable hope that it will result in cure or marked relief to the patient. Moreover, I desire to emphasize the fact that needless delay in operating is a factor leading to increased mortality; unfortunate results have followed operations performed as a last resort. The diagnosis having been made, surgical rather than medical care is demanded.

We know nothing definite as to the pathological process which would warrant delay in operating; were surgical intervention a prompt procedure, that is, operation on the first or second day of the attack, practically all cases of appendicitis could be saved. In every fatal case of appendicitis there has been a period in which the patient could have successfully undergone the operation. There is no other major surgical operation which is so reasonably sure of success, symptomatically as well as surgically, after early operation and when prompt interference means as much to the patient.

In a series of fourteen cases of appendicitis, of varied type, in which I have been called upon to operate within the past six years, it was my misfortune to lose two. These, however, cannot be attributed to the operator, they being operations of emergency—suppurative and perforative, and

which I was called in haste to perform out of the city. Were it a question of a surgeon's percentage, mortality and recoveries, my better judgment would have dictated not to operate in these cases; it was the desire of the attending physicians and the parents of both patients that I should give the possible chance, which I proceeded to do. In operations of emergency, even though death be invited, one cannot always decline to operate.

The two cases in which death occurred are of interest. In one, a girl aged thirteen years, the disease was fulminating in character, of but three days' duration. The appendix was of a diameter of one's thumb, gangrenous and sloughing at its base, with honey-combed pus pockets and adhesions profuse; septic peritonitis was in evidence. A hard fecal endolith, the size of an orange seed, was found in the middle third of the appendix, a condition which in the early days of appendicitis had given rise to the theory of orange, lemon or cherry pits as the chief factor in etiology.

The other case, a young man aged nineteen years, temperature 103° F., was what I term one of sacculated suppurative appendicitis, an appendiceal abscess with protective adhesions, in which I removed fully a quart of fetid pus. The abscess cavity was thoroughly irrigated with hot normal salt solution, drainage being continued by means of iodoform gauze strips carried through an opening left unsutured in the abdominal wound, the sac not being removed.

This case was certainly a remarkable instance of appendiceal abscess with protective adhesions, in which the sac contained a quart of fetid pus, which had been forming for some days. The patient's vitality was at a very low ebb at the time of operation. In this instance is emphasized what I have already referred to, the fact of needless delay in seeking operative interference.

Regarding the cases in which recovery ensued, several are of interest pathologically and because of attending complications. In one, there was associated intestinal obstruction, a loop of the ileum within a foot of the ileocecal junction, being found strangulated and cyanosed by a fibrous band one inch in length and the diameter of a goose quill, running from the stump left of the broad ligament, following an oophorectomy eight years previously, to the middle portion of an elongated and inflamed appendix. The fibrous band was ligated with catgut at the old stump, and the appendix including the band ligated with silk and removed, the patient being subsequently entirely relieved of all untoward symptoms. The diagnosis in this instance was one of intestinal obstruction with probable appendicitis, the patient having presented symptoms of the former especially only three days previous to operation.

A second case, a young man aged twenty-eight years, was of rapid development. The appendix was acutely congested and in part gangrenous, bordering on perforation near its apex; temperature 102.4° F. at the time of operation. The omentum was much injected and in great part adherent, a portion of it being ligated and removed;

¹ Read at the Third Annual Meeting of the Atlantic Coast Line Surgical Association, Jacksonville, Fla., November, 1903.

the appendix had a broad base with firm mesentery attachment.

Two cases were complicated with right interstitial salpingitis, the appendix and the fimbriae of the tube in each instance being intimately adherent. The right tube and ovary as well as the appendix were removed in both cases; and in addition, in one of these I performed a myomectomy for subserous fibroma, the size of a lemon, located on the posterior wall of the uterus. Not infrequently we find the appendix unusually long and adherent along its whole length to the cecum, and even curving around the latter. In such instances it is by no means an easy matter to free the appendix from its attachments.

Silk is the material which I always use as a pedicle ligature; I have never departed from it; furthermore, I always make positive that my ligatures are both well placed and reinforced, to avoid any possibility of secondary hemorrhage.

Regarding pathological changes in the appendix, the investigations of Fraser after repeated experimentation upon rabbits, have given the following results:

1. Suppurative appendicitis ensued as a result of obstruction of the lumen through aseptic ligation of the appendix.

2. Closure of the lumen in regard to the virulence of infective germs normally contained in the appendix, proved that such is capable of converting an inoffensive into a most virulent organism, the post-mortem findings showing also marked pathological changes in the walls of the appendix, gangrene being present in a portion of the cases.

3. Closure of the lumen, a foreign body being contained therein, gave results identical with No. 1.

4. In the unobstructed lumen a virulent culture in the presence of chemic irritation gave a negative result; as did also a virulent culture in the presence of a foreign body.

5. Ligation of the vessels produced marked structural changes, undoubtedly due to a lessened resistance whereby an infection, which otherwise would be innocuous, obtains a permanent foothold. Foreign bodies do not cause appendicitis unless infection ensues, and only become a menace when associated with obstruction of the lumen.

As regards the pain in appendicitis, Tripiier has formulated the law, confirmed by experience, that none of the affections of the abdominal viscera are accompanied by attacks of pain unless the surrounding peritoneum is involved in some acute or subacute inflammatory process, and that the pain is more intense the smaller the quantity of the fluid exudate. Considering the variations in the position of the appendix a constant pain at McBurney's point is not to be expected. One should be guided by the severity of the symptoms present, ignoring the absence of symptoms usually present.

Elevation of temperature, while a necessity to diagnosis, is no indication of the degree or ex-

tent of the pathological process. Preconceived ideas based upon experience often prove valueless, as a positive opinion prior to operation cannot be given as to location, attachment or condition of an appendix.

BEGINNING GENERAL PARESIS, ITS RECOGNITION AND MANAGEMENT.¹

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A DISEASE which has as its result the desolation both mental and physical of its victim, would seem to call imperiously for early recognition and treatment, to the end both of staying its progress as much as possible, and of forestalling the dangerous consequences to family and community resulting from the foolish, reckless, and often violent actions of a person impaired in his powers of self-control, reason and judgment. Such a disease we have, in that chronic degenerative affection of the nervous system, known as dementia paralytica, the progressive paralysis of the insane, general paralysis or general paresis.

While probably not a new disease, its recognition as a clinical and pathological entity dates back only about eighty years, and even to-day there are some authorities who maintain the idea of its duality, as Regis when he speaks of paralytic dementia, and paralytic insanity. It was formerly regarded as quite rare, a case in this institution having been visited as a curiosity as recently as thirty-seven years ago.

This is hard to understand, in view of its prevalence to-day, for unhappily it seems to be growing in frequency. Statistics vary considerably, but the following from the Vienna State Asylum are most striking. In 1838, general paresis constituted 12.6 per cent. of all the cases admitted; in 1867 the figure had risen to 18 per cent.; while during the ten years ending in 1897, it had reached the proportion of 30 per cent. of the total admissions.

In this country it is undoubtedly less frequent, its proportion to all cases of insanity being stated at from 6 to 10 per cent. In the New York State institutions, it constituted in 1901 8.6 per cent. of 4,916 admissions, while in 64,609 admissions, since 1888, it was present in a trifle over 7 per cent. of the cases. The disease is much more common in an urban than in a rural population, and many more men than women are affected, though this latter varies from a proportion of two men to one woman in some parts of Russia, to one to seven or one to ten in this country, while in an entirely rural population the disproportion may be even greater. Among women of the better class it is relatively rare.

General paresis has been pithily styled by Krafft-Ebing, a product of "civilization and syphilization," and in its production syphilis

¹ Read at a meeting of the Mercer County Medical Society, March 8, 1904.

² Received for publication April 5, 1904.

seems to play a most important if not the chief rôle, the number of cases in which previous syphilis can be shown being estimated all the way from 25 to 90 per cent. Abuse of alcohol is undoubtedly an etiological factor, but its importance is much disputed. Alcohol carries in its train its own special forms of mental disease, among them one which closely resembles general paresis. It certainly does act as one of the sources of overstimulation of the nervous system, and in its not uncommon association with syphilis it may have a decided influence. However, as one of the early symptoms of general paresis is a tendency to indulge in alcoholic, as well as in other excesses, there is liability to confound cause and effect.

Hereditry for insanity or nervous disease may have an influence, though as to this again opinions diverge widely. The modern struggle for existence with its tendency to produce both mental and physical stress, through overwork, excitement, and intemperance in eating and drinking, appears to be chiefly responsible for the increase in general paresis. These comprise the main causes of this disease. General paresis, however, cannot be considered a direct manifestation of brain syphilis, for while its lesions are of fairly definite character they differ from those of syphilis proper. It can at best be considered like tabes, a metasyphilis. The ravages of the disease are not confined to the brain, but may extend to any part of the nervous system, and after death other organs are also found to be affected. It is doubtful, however, if the latter lesions should be considered as properly belonging to general paresis.

In a disease of so varied and irregular distribution, it is small wonder that a complex clinical picture should be presented. Broadly speaking, however, the two features which stand out are progressive mental failure, and paresis of muscles, more or less extended. It is a disease preeminently of the prime of life, men from thirty to fifty years old being its chief victims. It is not unknown outside of this period of life, however, and the juvenile cases especially seem to be growing in frequency. These nearly always occur in the victims of hereditary syphilis. Cases have been reported at as early a period as ten years of age, while in the seventh decade the disease is not unknown. No grade of society is immune, for it attacks high and low, among both preferring those of convivial habits, in whom syphilis and alcoholism are apt to be present. In the great majority of cases the disease begins slowly, and there is a period more or less prolonged, during which the patient's mental condition seems to be undergoing a change, though perhaps definite derangement is not apparent. The victim may show more or less marked exaltation of spirits, with abandonment of care, excitability with irritability and restlessness, or, on the other hand, vague depression and fears, or hypochondriacal ideas. As a rule he sleeps badly.

Again, the first symptom to be noticed may be a change in conduct. The previously sober, moral

and prudent man plunges into alcoholic and sexual excesses, squanders money in unnecessary, foolish, and extravagant expenditures, and may even resort to trifling fraud or theft to obtain articles which he could perfectly well procure in a regular way. In form the disease varies greatly, and these variations overlap one another, but in practice it is usual to recognize three general types:

1. *The Dement Type*, in which the symptoms are those of a progressive mental failure without marked depression or excitement, or definite delusions.

2. *The So-called Classical Type*, where there is exaltation and excitement, with increased feeling of well-being (euphoria), rising to grandiose delusions, such as of unrivaled strength, fabulous wealth or supreme power. The patient has begotten 1,000 children, owns millions of money, is king of kings; etc.

3. *The Melancholic Type*, characterized by depression, sleeplessness and hypochondriacal ideas. To these are sometimes added an agitated, periodical and ascending type, the second being characterized by changes of mood from excitement to depression and vice versa, and the last beginning like tabes, with loss of power in the legs and ataxia.

One and all, however, proceed ultimately to the same issue of dementia, ending in death in marasmus, unless the victim is cut off by some intercurrent disease, or dies in a convulsive seizure. The dement type has of late years been growing more common, and to-day is by far the most frequent, the classical form being the exception rather than the rule. For the general practitioner, however, it is the first stage of the disease which is of importance, for he it is who sees the patient at this time, and if he recognizes the probability of what is to come he may be able to preserve the victim from courses which can only hasten the fatal outcome, and to protect the family from the humiliating, indeed, often the tragic results, of the misconduct of its now irresponsible head. The public, too, is to be considered, for instances of swindles, great and small, of abuse of authority on the part of military and naval officers, or of judges or others in high positions, of criminal assaults, and even of murders, by persons in the early stages of general paresis are unfortunately far from rare.

What are the earliest symptoms? There is no one which taken alone is characteristic, but a probable diagnosis is to be based upon the combination of certain mental and physical changes, with due consideration of the age of the patient, his position in society, and his previous history, especially as regards the likelihood of former syphilitic infection.

As a general proposition, in any mental disturbance arising in a man between the ages of thirty and fifty years, who has no history of having shown mental unbalance earlier in life, the possibility of the case being one of general paresis should at once present itself. If there is a clear

history of previous syphilis, the possibility becomes a probability. In women of corresponding age the idea of general paresis does not suggest itself so prominently, but, nevertheless, the social position and previous life of the patient is to be taken into consideration, and with the history of exposure to syphilization the probability of general paresis becomes strong.

We have under observation at present an interesting instance of so-called conjugal general paresis. The husband was admitted suffering from general paresis, within the year the wife following him with the same disease. Each presents an example of the dement type, but in the case of the woman, the disease is running a more rapid course than in that of the man. The history is fragmentary, but the woman has on her lip a well-marked cicatrix, possibly the former seat of a chancre.

The further removed from the age limits mentioned the patient may be, the less the probability of the disease, though it is not excluded, as both juvenile and senile cases of paresis are not unknown. From what has been said above, it will appear that the mental symptoms of general paresis vary widely, and to make a diagnosis from them alone is seldom possible. Whether the patient is depressed or exalted, or exhibits expansive delusions, with or without motor excitement, there is generally, however, an underlying defect of intelligence, shown in loss of memory and power of judgment, which, though it may be difficult to elicit, can usually be brought out by careful questioning. Delusions when present are not built up logically—though from false premises—and defended with plausible arguments, as in the case of the paranoiac, but are unsystematized, changing from hour to hour, and often at once suggestive by their immensity and grotesque absurdity. Hallucinations are exceptional and there is lacking the true maniac's rapid flight of ideas. Upon the combination of somatic signs with mental symptoms, however, we depend for the differentiation of general paresis from other forms of insanity.

At this point it is well to emphasize the fact that by general paresis or general paralysis, we mean a definite disease involving both mental and physical spheres, in persons at the prime of life, and not the gradual loss of power often with mental failure observed in old people, generally as a result of arteriosclerosis, and consequent nutritional changes in the brain. This distinction, there is reason to believe, has not always been made with sufficient sharpness, by the profession in general. As was stated above, paresis of muscles more or less extended is to be considered as an essential feature of the disease. This shows itself in the inability to perform certain functions properly. The symptoms most likely to be found in the earliest stages are alteration of the knee-jerk, failure on the part of the pupil to react for light, and optic atrophy. A combination of one or all of these with mental change, provided its presence cannot be explained on other

grounds, makes the diagnosis practically certain. It will be noticed that the eye symptoms with loss of knee-jerk are indicative of locomotor ataxia, and in fact an exceedingly close relationship exists between this disease and general paresis. Both seem to follow, in the vast majority of cases, a syphilitic infection more or less remote. Both attack especially men in the prime of life, but in the one the somatic symptoms are predominant, and the mind may remain clear, while in the other the mental symptoms soon come to the front. The question of the relationship of these two diseases is interesting and much discussed, but cannot be entered into here. Suffice it to say that while mental symptoms may occur both as a result, and as an accidental complication of tabes, a middle-aged person showing mental alienation, with loss of knee-jerk and of the pupillary light reflex is in the vast majority of cases afflicted with general paresis. The ataxic symptoms may long antedate the mental change, as shown in the case of a man thirty-five years of age, recently observed, who presented a characteristic picture of tabes, and had his complaint so diagnosed by a number of physicians, nearly three years before the advent of definite mental symptoms, the onset of convulsive attacks, and speedily developing marasmus made the diagnosis clear. On the other hand in a man demented since a psychosis in early life, tabes developed just beyond middle life and he died after thirty-seven years' residence in the hospital at the age of fifty-nine years, having at no time shown the picture of general paresis.

It must be remembered, however, that loss of knee-jerk may be due to any lesion which interrupts the reflex arc for the quadriceps extensor, whether situated in the muscle itself, in the nerve, or in the lumbar enlargement of the cord. It is a common symptom in multiple neuritis, and occurs in myelitis of the lumbar segments, and in some brain tumors. Again the knee-jerk may be sometimes lost in diabetes, and in Bright's disease. In the majority of cases of general paresis, however, the knee-jerk is exaggerated, on one or both sides. This exaggeration is of much less diagnostic value than loss of knee-jerk, since it may be present in a number of other conditions both functional and organic, and when not too marked is not a symptom of great importance. In not a few cases of general paresis, there is degeneration of the lateral columns of the cord, as in spastic paraplegia, and again both lateral and posterior columns are affected.

Where loss of visual power is apparent, an ophthalmoscopic examination should be made—if necessary by an eye specialist—for optic atrophy is an important symptom in this connection, provided its other causes can be eliminated. The characteristic pupillary anomaly is failure to contract for light, while contraction for accommodation remains. This condition known as the Argyll-Robertson pupil, is very suggestive, and may be present long before other symptoms are manifest. In a study of 17,000 patients, Thompson, of

Bonn., found that of those showing the Argyll-Robertson pupil, 90 per cent. either had tabes or general paresis. Some caution is needed, however, in eliciting this symptom, the light should be good and should fall evenly upon the eyes. The presence of an old iritis which has caused adhesions, and interferes with the enlargement of the pupil, would be shown by its irregular outline. Difference in size of the pupils is also a sign of some importance, but of much less value than immobility, since slight differences are not infrequently congenital, or again are due to changes in the sympathetic innervation or to bygone iritis. The immobile pupil is generally a narrow one, although not always. In young, anemic, and nervous persons, the pupil is wide as a rule, but it tends to become narrower as age advances.

The earliest symptom of impairment of muscular power is incoordination, as shown by tremor and inability to perform certain movements. Specially characteristic are the disturbances of speech, and of handwriting. The speech disturbance, which is due to the incoordination of the muscles of the tongue and lips, consists in inability to properly bring out and combine syllables into words—the "syllable stumbling" of the Germans, for instance, instead of artillery the patient may say "rattillery," etc. Syllables may be left out, slurred, or transferred. Where the patient's memory has become very defective, he cannot remember a word long enough to repeat it after another person, but may bring out only the first syllables. The voice is apt to become monotonous, and its pitch may be changed, generally lowered. As the patient tries to speak, there is often observed, what Clouston calls "the fatal tremor," about the lips, which is very characteristic. Speech can best be tested by asking the patient to repeat after you such words as abnormality, artillery, truly rural, etc.

Disturbances of handwriting which may occur comparatively early, are due to muscular incoordination, and to failure of memory, lack of attention, and indifference on the part of the patient. Berkeley declares that the first irregularity is apt to appear in the upstroke of the letters, which tends to present a sawlike edge. The letters are also apt to be uneven in size, and not in the same horizontal plane. Letters and syllables are left out, and blots are frequent. Defective innervation, and twitchings of one side of the face, paresis of the eye muscles, and so forth, have also some diagnostic value, but they also occur in other conditions, and their interpretation is attended with considerable uncertainty. In the developed disease, however, there is a heavy masklike expression, which is very characteristic.

Local anesthetics and paresthesias may also be present, but are not always easy to elicit. An old test for general paresis is inability to smell pepper. A symptom which does not properly belong to the early stage of the disease, but which is not infrequently the first thing to call attention to the serious nature of the case, is the occurrence of a paretic seizure. This, when it occurs in a case

otherwise suspicious, clinches the diagnosis. It may take the form of a slight vertigo, easily mistaken for fainting, or may vary from a slight twitching of certain muscles, as of one side of the face or of one hand, to a general epileptiform convulsion. Again the attack may have an apoplectiform character, and be accompanied by rise of temperature, and congestive symptoms, and may leave behind a weakness of one limb or of one side of the body, which, however, generally clears up in a few days or a week.

The interpretation of such attacks is often difficult, but in a man in middle life, if previous epilepsy, trauma, alcohol or other poison and uremia can be excluded, and focal brain symptoms are absent, the probability of their paretic origin is very strong. Again, a paretic seizure, as a rule, differs from a true epileptic fit. The patient frequently does not entirely lose consciousness, and the convulsion is much more apt to be partial or Jacksonian in character. In an apoplectiform attack occurring for the first time some caution is necessary in forming an opinion. These comprise the chief symptoms to be expected in the early stages of general paresis. No one alone is characteristic, but two or three combined may enable us to form a positive opinion.

Practically the one disease from which it is most important to differentiate general paresis in its early stages, is neurasthenia, with predominant cerebral symptoms. This latter is also a disease of middle life. In it hypochondriacal ideas and depression, with loss of sleep, irritability, headache and vertigo, and tremor of the muscles of the face, tongue, lips and fingers may occur, as they do in general paresis. There may be reduction of mental capacity in both diseases, but in neurasthenia there is simply weariness, and no real mental failure. The neurasthenic will not present loss of knee-jerk, but rather exaggeration, and his pupils are not immobile. The neurasthenic as a rule feels worse in the morning, and improves toward night, while in the paretic, the reverse is the case. Lastly in neurasthenia there may be a history of a constitutional neurosis dating back to early life, while in the paretic there is apt to have been previous syphilis. Hoch states it as his opinion that of those breaking down from excessive stress, in the middle period of life, those who have had syphilis will probably develop general paresis, while those who are free from specific taint will be neurasthenic.

The two other conditions which are most likely to be confounded with general paresis, are cerebral syphilis, and chronic alcoholic insanity. In each there may be mental failure with or without delusions, convulsive attacks, and perhaps speech disturbance, and paralyses. Cerebral syphilis, however, as a rule, occurs nearer the primary affection than does general paresis, and headache and focal symptoms are apt to be present. Alcoholic pseudo-general paresis may resemble general paresis quite closely. The knee-jerk may be lost through an accompanying alcoholic neuritis, but the pupillary changes are generally wanting,

and under enforced abstinence, the symptoms are apt to clear up either wholly or in part.

To recapitulate briefly: Severe neurasthenic, or hypochondriacal symptoms, or any decided mental change coming on without known cause in a man from thirty to fifty years old, should be regarded as suspicious. If there was previous syphilis the probability of general paresis is great. If in addition there is immobility of the pupils, with loss of knee-jerk, the diagnosis is practically certain, while if to the above there are added the characteristic speech disturbances, and a convulsive seizure, there is no longer any doubt.

The diagnosis once established, the prognosis is of the worst, the fatal result being only a question of time. The average duration of a case of general paresis is from two and a half to three years. Some cases—the galloping form—run their course in a few months, however, while in others the disease extends over years. There is now under my care a typical case of the tabetic type, which has certainly existed for ten years, while a recent writer has reported a case which had lasted sixteen or more years. Again there are remissions which may extend over one or two years, during which time the patient seems almost well, and these probably have given rise to reports of cured general paresis. Unfortunately we have no specific treatment for the disease, and are reduced to treating symptoms as they arise. Its prevention is directly connected with that of syphilis, and with the thorough treatment of that disease when it occurs. The theory of an intoxication, or a disordered chemism of some sort as a causative factor, is held by some authorities, but our information on this subject is at present too meager to allow us to formulate an adequate line of treatment.

Bruce claims to have procured amelioration by injection into a paretic of the serum of another paretic who was in a remission. Donath says that he has produced marked improvement in six paretics by the injection of massive doses of a rather complex solution of salts, but these methods are not yet on an established basis. A course of anti-syphilitic treatment may be tried, but has usually been found of little use, if not deleterious. General tonic treatment, with mild hydrotherapy, combined with measures to procure proper sleep, may be of benefit.

The chief duty of the physician, however, is to guard the patient from alcoholic and sexual excesses, and to see that his strength is in every way husbanded, and that he is kept from excitement and worry. In a family which can afford to pay for a trained attendant, a case of the dement type may possibly be managed at home, but early interment in a good institution, under constant and intelligent care, is by far the safest and cheapest measure. Even for a case with severe neurasthenic symptoms, where the diagnosis is in doubt, a sojourn in a sanitarium, where restorative treatment can be carried out and where precautions against any eventuality can be taken, is strongly indicated.

THE BACTERIOLOGY OF PANOPHTHALMITIS.¹

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FROM the observations of several investigators, it seems an established fact that Fraenkel's pneumococcus is the most frequent cause of panophthalmitis. While in some cases a mixed infection of pneumococcus and staphylococcus or pneumococcus and streptococcus has been found, the pneumococcus is probably the essential etiological factor.

Gaspanini, Unthoff, Hansell, Bocci, Mündler, and Schwartz have all obtained such results. Hirota has reported three cases of panophthalmitis, all of which he ascribed to the pneumococcus. The first case was one of hypopyon keratitis with perforation and panophthalmitis and mucocoele. Twenty-four hour cultures showed numerous pneumococci and few staphylococci. One-half c.cm. of pneumococcus bouillon injected into a white mouse caused death in twenty-four hours. Pneumococci were found in the blood. One-half c.cm. of staphylococcus injected into a white mouse caused death in thirty hours. Nothing was found in the blood. Cultures two weeks later produced the same result.

In the second case, there was a mucocoele. Cataract operation was followed by wound infection. Cultures showed pneumococci and few staphylococci. One-half c.cm. pneumococcus bouillon injected into a white mouse caused death in twenty-two hours. Injection of staphylococci had no effect. Three weeks later, pure cultures of pneumococci were obtained. In the third case there was also mucocoele. Pure cultures of pneumococci were obtained, which, when injected into a mouse, caused death in twenty-two hours. From the pure culture of the pneumococcus in one case and from the results of animal inoculation, the author concludes that the infection by the pneumococcus is the essential cause of panophthalmitis.

In all three of his cases a mucocoele was present in which he claims is often found pneumococci. As is well known, this organism is the most frequent cause of ulcer serpens corneae. In the last few months two cases of panophthalmitis have been examined bacteriologically at the Presbyterian Eye, Ear and Throat Hospital. The first case was wound infection and panophthalmitis following cataract extraction. The operation was performed under the usual antiseptic precautions on a colored man who some weeks before had had an attack of pneumonia and had apparently entirely recovered. There was no mucocoele, the conjunctiva appeared healthy, and the operation was perfectly satisfactory.

The next morning, less than twenty-four hours after the operation, the wound was seen to be infected and the eye was soon full of pus. Smears from the pus showed scattering diplococci. Twen-

¹ Received for publication May 27, 1904.

ty-four hour cultures revealed diplococci in abundance. Three c.cm. of a bouillon culture were injected into a guinea pig. The animal died twenty-two hours later and smears from the heart's blood showed encapsulated pneumococci. Cultures from the other eye and from the blood were negative as to the presence of the pneumococcus. Later cultures were always pure pneumococci. In this case the pneumococcus was certainly the direct local cause of the infection.

The other case was Panophthalmitis from a knife injury. Smears from the pus showed nothing. In twenty-four hour cultures pneumococci and staphylococci were found. Inoculation experiments on guinea pig gave pneumococci in the blood. In this second case the essential cause seemed to be due to the malignant pneumococcus. The results confirm those of the authorities named above. Dr. Darling, of the city health department, has recently informed me of a case of panophthalmitis caused by the pneumococcus.

Now that the cause of the disease has been established it behooves us to use our best endeavors to prevent such infection. According to Randolph, the normal conjunctiva always contains organisms, the commonest species being the *Staphylococcus epidermidis albus* of Welch, a coccus resembling the *Staphylococcus pyogenes albus*. Lawson found the normal conjunctiva to be sterile in twenty per cent. of cases and pyogenic cocci to be rare, and, when present, non-virulent. Other observers have stated that the conjunctiva is generally sterile. It is probable that organisms in the normal conjunctiva are non-virulent, and in order to prevent infection following cataract operation, it would seem advisable to ascertain whether or not the pneumococcus is present. If so, the operation could be deferred for a time and measures taken to get rid of so malignant an organism. The saving of one eye from infection would be worth the trouble entailed in the taking of cultures and of animal inoculations.

Hirota's observations have shown that a mucocele increases greatly the danger of pneumococcus infection. It would be a simple matter to investigate this disease for the same organism. It is our duty as oculists to take every precaution to prevent infections of all kinds and especially the pneumococcus infection which has undoubtedly caused the loss of not a few eyes. I firmly believe that by bacteriological examination, we can at least decrease the number of cases of panophthalmitis following cataract extraction.

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Mortality for July.—The deaths for July were 1,958, 213 more than were reported in June, and 432 less than July, 1903. The death rate for the month was 11.95 per 1,000. The deaths under one year were 122 less, and those between one and five years 106 less than in July, 1903. The Health Department attributes the low mortality to propitious weather and a remarkably good water supply. Acute intestinal diseases heads the list of death causes, with 333; consumption comes next with 233, and then follow violence, with 184, Bright's disease with 144, heart diseases with 143 and pneumonia with 123.

AUTO-INTOXICATION OF GASTRO-INTESTINAL ORIGIN¹

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THAT the character of gastro-intestinal digestion bears mightily upon the intensity and progress of most diseases, is, I think, a statement that will go unchallenged, and that this is the prevailing opinion is proven by the exactness of diet invariably outlined in sickness.

The question then is, Why? and to me the answer seems to be that, either because of a diminished digestive activity, or because of already existing gastro-intestinal disease, the fermentative changes so prone to take place in the digestive tract, become exaggerated.

These changes, the result of chemical processes and bacterial activity, cause the disengagement of gases, especially sulphureted hydrogen, and of potassium and ammonia and also of certain organic toxins and ptomains (allied to the vegetable alkaloids) that are reabsorbed into the circulating media and prove poisonous to the animal cells to a greater or less extent, dependent upon the amount absorbed on the one hand, and on the other upon the rapidity of excretion or of their destruction by the liver.

In acute febrile and eruptive diseases; in most chronic affections, notably renal and cardiac; in neurasthenia and other and better defined conditions of the nervous system; in insanity, and, indeed, in most pathogenic states, the condition of gastro-intestinal digestion with its possibly resulting greater or lesser degree of auto-intoxication, has a bearing upon prognosis and treatment that must not be ignored.

This condition of auto-intoxication is, I believe, as much of a reality, vastly more important and many times more frequently demanding our attention, than the poisoning that supervenes upon the taking into the body of decomposing food products. There is this great difference, however. In the case of the poisons generated within the digestive tract their production is comparatively slow, and when their elimination is normally affected their removal is as rapid as their production, and the system does not become overwhelmed.

Paul Paquin says, relative to the various products of food decomposition and excrementitious matter, "Individually, collectively or associated, they are more or less grave factors in modifying our happiness and safety. In classified diseases such as typhoid or scarlet fever, etc., or any malady reducing nervous control and special functions of the cells of the digestive apparatus; indeed, in any condition lowering the general defensive power of the organism as a whole, the microbes of the digestive tract may become most damaging enemies."

In an article upon "Relapse in Typhoid Fever," read before this society and published in the *Virginia Medical Semi-Monthly*, April 11, 1902, I

¹ Read at a meeting of the Medical and Surgical Society, District of Columbia, May 5, 1904.

called attention to the fact that under the stimulus of the toxin of typhoid fever the normal intestinal inhabitants may become virulent. May it not as well be the case—and to me it seems more than plausible—that under the stimulus of other toxins, as in acute infectious diseases and influenza, the increased activity of normal intestinal germs accounts for many of the indications of auto-intoxication? Certainly the evidences of the presence of gastro-intestinal catarrh would give support to such a theory.

Gastro-intestinal auto-intoxication may result from the ingestion of decomposing food; from the fermentation or decomposition of food within the alimentary tract; or from reabsorption of bile or fecal matter.

The condition arising from the ingestion of putrefactive material may be properly classed under the head of true poisoning, not auto-intoxication, but the remote results arising therefrom would constitute a true auto-intoxication, and to this I will later call your attention.

In faulty digestion there are produced acid and nitrogenous compounds that have been shown to be poisonous. So long ago as 1790 Hufeland, in his work, recognized the condition of auto-intoxication from fermentation and putrefactive changes of food in gastro-intestinal disease. But probably to Bouchard more than to any other investigator must be given the palm for painstaking observation and research into this most interesting subject, and in particular as to the significance of the presence in both the digestive tract and the excretion of the kidneys of certain compounds, the products of bacterial energy.

To him is due the credit of showing the relation of indol in the intestines to indican in the urine, and that this relation is, to a certain extent, constant.

While indol, phenol, skatol and other products cannot be found in the fetus, pointing to the fact that they are the result of germs entering the digestive tract after birth, yet their presence afterward is so constant as to entitle them to be considered normal products of normal bacterial action. Their presence becomes abnormal when shown to be in excess, either by reason of overproduction, or because of incomplete destruction or elimination.

Indol, the product found in largest quantity, is thought to be the result of the activity of the colon bacillus, and shows disturbing effects upon the heart and produces degenerative changes of the liver. Phenol and skatol are found in much smaller quantities, and the source of their production has not, so far as I have been able to find, been determined. Cholin produced from food rich in lecithin is but slightly toxic and occurs particularly when the lower end of the small intestine is occluded. Neurin produced by further action upon cholin is intensely poisonous, increasing intestinal movements and having a paralyzing effect upon the heart.

Pasteur, some years ago, showed the existence in the mouth, stomach and intestines, of bacteria

that produce fermentation and putrefaction and elaborate ptomaines and toxins, which, absorbed, cause according to dose and rapidity of absorption, acute or chronic poisoning.

These poisons are usually eliminated chiefly by the kidneys except when that emunctory is unequal to the task, either because of the diseased condition of the organ, or because the poisons are formed with a rapidity too great to permit them to act efficiently.

By numerous experiments, that the scope of this paper will not permit me to present, it has been shown that the liver has a very important office to perform in the destruction of these poisons, taken up by the portal circulation, and that the indol in the hepatic vein is much less than in the portal vein. When, under such conditions, the liver is overworked, there ensues a condition of engorgement—so-called biliousness—and, continued into a chronic state, we may have cirrhosis.

The amount of indican in the urine bears to the indol of the intestines an approximately fixed relation, but is not as true a measure of albuminous decomposition in the intestines as the latter, for indican shows only the amount of indol absorbed in the intestines which reaches and is excreted by the kidneys, and is, therefore, the true measure of indol less the amount destroyed by the liver or carried from the bowels in the alvine discharges. The amount of acid in the stomach has ordinarily but little bearing upon the production of indol, as most of the bacterial action by which this body is elaborated takes place below the ileocecal valve and the acid secretions are neutralized before reaching this point, except in marked cases of acid fermentation.

Potash and ammonia salts, as well as ptomaines and toxins, are poisonous to the animal cells. Meat fiber contains these salts developed in the process of tissue metabolism, and it was an observation of this fact that caused Liebig to characterize beef tea as not only lacking in nutritive value, but as being actually poisonous.

It is a matter of common observation that constipation gives rise to many of the evidences of auto-intoxication, and yet the theory of self-poisoning is to a certain extent doubted by some because, they reason, the drier the fecal mass the slighter the opportunity for reabsorption and poisoning. As a matter of fact, constipation exists largely because of diminished peristalsis and the slower passage of the fecal mass to its resting place pending evacuation, is attended by increased absorption of its fluids and with these fluids there enter into the circulation coloring matter of bile, potash and ammonia salts and ptomaines and toxins in force. At the same time it is true that the condition most favorable for auto-intoxication is the semi-diarrheal state attended by one or two loose movements a day, for here the amount of fluid is large and the chances for absorption proportionately increased.

The effect upon the system of these abnormal products is dependent in large part upon the degree of perfection of the process of elimination,

particularly by the kidneys; and before proceeding further I wish to call attention to the important bearing of auto-intoxication of gastro-intestinal origin to renal disease.

There is no more indispensable organ of excretion than the kidney; no source of auto-intoxication more prolific than the gastro-enteric tract. Therefore, if the first is damaged it becomes of the gravest importance that the digestive tract, absolutely necessary for body nutrition, may not be transformed into a factory and supply depot for materials to poison the body, with no compensating emunctory to eliminate the poisons thus produced.

In violent diarrheal conditions, as in cholera morbus and cholera infantum, the rapid withdrawal of fluids from the body may result in suppressed kidney function and a coincident auto-intoxication, not on account of the great excess of toxins absorbed, but of their accumulation in the system by reason of failure of elimination.

As already stated, the liver acts as a barrier to the entrance into the system of ptomaines and toxins, and when, by reason of failure of the liver to do its normal work, or by reason of the demand being beyond the normal liver capacity to work, ptomaines and toxins enter the system and auto-intoxication ensues in inverse proportion to the effectiveness of kidney elimination, with resulting headache, irritability, fatigue, muscular soreness, hypochondriasis, vertigo, neurasthenia, lethargy, stupor, insanity, cutaneous affections such as pruritus, acne and urticaria, asthmatic attacks, and functional disturbances of the heart.

Bouchard states that the ingestion of the extract of 2.5 gm. of decomposing meat is sufficient to kill a man.

When decomposing meat is taken into the stomach the symptoms are violently acute if the ptomaines exist in sufficient quantity. Such would be a case of true poisoning, the system being overwhelmed as in the case of large doses of the vegetable alkaloids, and the termination should be equally acute; but as a matter of fact, when so-called ptomain poisoning occurs it is rather the active bacteria than the ptomaines taken that cause the disturbance; here some hours must elapse before marked evidences of poisoning appear, and this constitutes a true auto-intoxication. The process of decomposition begun and but slightly advanced in the food is prolonged and intensified in the digestive tract, absorption goes on with a rapidity too great for elimination, and we have the symptoms of acute auto-intoxication. It is more than probable, too, that bacteria already existing in the stomach and intestines are, in this bath of toxins, stimulated into increased activity and form no inconsiderable portion of the enemy making the assault.

In a variety of chronic affections of the stomach and intestines there appear evidences of poisoning by toxins and the absorption of the products of acid fermentation and the gases and salts of intestinal decomposition. In cancer of the stomach and intestines; in chronic dyspepsias gastric and

intestinal; in chronic diarrhea; and in dilatation of the stomach are found the before-mentioned indications of auto-intoxication.

Personal idiosyncrasy to certain foods is, I believe, rightly considered a condition calculated to bring about a true toxemia after the ingestion of such foods. Probably every one here has seen cases of this kind. The indulgence of certain individuals in strawberries, fish, crabs and numerous other foods that are recognized as foods that "disagree with them," is invariably followed by such symptoms as nausea, vomiting, headache, fever, eruptions in the shape of hives, etc. It would seem that the use of such foods, as also of those repellent to the stomach, whether such distaste is the result of disease or personal dislike, is attended by rebellion of the stomach nerve supply against them,—exactly as the special senses rebel against things disagreeable to them,—digestion in inhibited fermentation or decomposition ensues and we have a typical, though not severe, auto-intoxication; not severe because the liver, bowels and kidneys are equal to the task of protecting the organism against the sudden assault. Where these organs are diseased and defective we may have more severe and even fatal results, and such, I believe, is the true condition in many cases of sudden death in aged, and even young persons, with weakened hearts.

It has also appeared to me that the more chronic condition of auto-intoxication may contribute largely to the characteristic deaths of many of the aged. Such cases usually begin with disturbed heart action without preexisting heart lesion, unless we consider arteriosclerosis, which normally exists in old age; then follows some degree of asthmatic breathing and increasing weakness; the urine is loaded, showing evidences of faulty metabolism; sleeplessness passes into somnolence; the tongue is coated and the breath offensive; the bowels are in a fluctuating condition of constipation and diarrhea; and the temper is more and more irritable. With ever-increasing disinclination for food and more and more evidence of failure of the digestive function, death finally ensues in a few months. Yet, study the case as you will, you can find no one or more organs affected to a degree necessary to account for the end.

To-day the surgeon, as a matter of routine, prepares his patients for operation by the preliminary administration of a cathartic, the evident purpose being to clear the intestines of waste material, and in this he does wisely, for the intestines are thus, in large part, relieved of bacteria and toxins, and the possible complication of toxemia from this source is reduced to a minimum.

My attention has been called a number of times to a class of cases dying after operation for appendicitis in which there appeared no local nor well-defined general condition to account for such a termination. One such patient of my own I had an opportunity to observe and the symptoms were those of profoundly disturbed digestion and heart terminating shortly before death in coma.

The local condition was apparently all that could be desired, and the case, to me, seemed to be one of gastro-intestinal auto-intoxication.

Increase in the frequency of epileptic seizures, attending excessive feeding and resulting imperfect digestion, is such a common occurrence as to call for mere mention.

It has been claimed that during chronic toxemia there is a progressive lessening of the bactericidal power of the blood serum; and if such is true we can readily understand to what an extent such a condition would add to the gravity of various diseases.

Dr. Otto Kauffman says that certain nervous disturbances and organic nervous diseases can be explained by gastro-intestinal auto-intoxication.

Dr. Hubert Work says that loss of weight and anorexia occur so constantly in connection with certain psychoses as to suggest a common cause. Further that it is certain that insanities do result from prolonged digestive disturbance and that auto-intoxication from the alimentary canal may alone cause many cases.

Dr. Forbes Robertson considers toxic action the most frequent primary etiological factor in the production of insanity, and in this connection insists upon the paramount importance of the gastro-intestinal tract. He believes that toxemias from this source are important factors in the production of various acute and chronic diseases; cases of dementia; locomotor ataxia; general paralysis; senile insanity; chronic alcoholic insanity; idiopathic epilepsy; most cases of acute and chronic mania and melancholia; and chronic Bright's disease. He believes that the majority of cases of insanity are not primarily diseases of the brain, but the result of toxins from other sources which affect the brain cells, disorder their metabolism, and more or less permanently damage, or even destroy many of them.

There is one quite fashionable disease to which I would invite special attention. Neurasthenia, like malaria, is oftentimes a cloak to cover a multitude of sins, whether of lack of observation, or of catering to the whimsicalities of patients who dislike to be told, even in polite terms, that they are paying the penalty for past gluttony, but much prefer, indeed, are pleased, to be told that they are neurasthenic. Understand, I do not deny the existence of a true neurasthenia, or, as I interpret it, fag of brain and nervous system from business worry or too great mental effort, but I do believe that the majority of such cases are nothing more or less than faulty digestion with resulting ptomaines and toxins in excess. The symptoms most prominent are such as may be found in a less degree in chronic dyspeptics and the greatest, and, indeed, almost the only benefit to be derived is from means calculated to abate the gastro-intestinal disease and its resulting auto-intoxication.

There has ever prevailed with the medical profession a dread of the use of laxatives in typhoid fever; yet, believing in the effect upon the typhoid infection of a coexisting gastro-intestinal auto-

intoxication, the result of bacterial activity and of constipation when the latter exists, I have frequently found excellent results to follow the cautious administration of calomel.

I propose to say but little on the extensive subject of treatment, and that only in general terms, for the time at my command will not permit a detailed consideration of this part, and very important part, of auto-intoxication.

The conditions to be met are: (1) Avoidance of the introduction of foods most liable to fermentation and putrefactive changes, and of substances already undergoing such changes; (2) the lessening or destruction of bacterial energy within the gastro-enteric tract; and (3) relief of the system from toxins, ptomaines and products of acid fermentation, either by rapid removal before absorption, or by aiding their excretion by the usual organs of elimination.

The avoidance of foods in a condition of fermentation or decomposition however slight is, of course, imperative.

A much harder question to determine is the correct diet adapted to the varying conditions of disease of the digestive organs, a question that can only be settled after a proper consideration of each case under treatment. It is safe to say, however, that in all cases foods rich in starch and sugar are to be avoided, because of the ease with which they undergo fermentative changes; and also such foods as are hard to digest, which latter give the greatest opportunity for bacterial development and the production of toxins.

It is likewise necessary to avoid too frequent and excessive feeding, for foods easiest of digestion given in too large quantities, overtax the digestive function, perhaps inhibit it entirely, and thereby afford opportunity for fermentation and decomposition.

The effect of drugs administered by mouth or rectum upon bacterial energy or life is, to say the least, rather uncertain. Various remedies, for example iodine, creosote, carbolic acid, naphthol, iodoform and charcoal, as well as many others, have been recommended. I believe I have run the gamut, only to fall back upon creosote and charcoal, the former in moderate, the latter in large doses, as seeming to be of most service.

Stomach and colon washing I have found quite valuable in removing the offending agents. By means of the stomach tube remains of undigested food, the product of fermentation, gases and bacteria are removed and the organ left in far better condition for the next food ingested. No one who has ever used the stomach tube with any frequency has failed to observe repeatedly how certain symptoms in catarrhal and those dilated conditions of the stomach that so much distress the patient, disappear and how bowel conditions are benefited also.

Colon washing is likewise valuable, though for obvious reasons it cannot be carried out so thoroughly as stomach washing. Inasmuch as bacterial activity is greatest below the ileocecal valve, and because the washing will often remove fecal

accumulations not touched by laxatives, we would naturally expect, and usually find, that colon washing when thoroughly done proves of marked benefit.

Unfortunately these two methods of washing reach but a part of the digestive tract. Toxins in the small intestines will be absorbed, at least, in part, and upon the rapidity and effectiveness of their destruction and elimination by liver and kidneys depends to a certain extent the degree of auto-intoxication. The small intestines are swept and liver engorgement relieved by occasional mild laxatives, thereby at the same time lessening the amount of poison to be absorbed and increasing the functional activity of the liver.

The effectiveness of the kidneys is increased by moderate indulgence in water—but very sparingly during meals; complete prohibition of alcoholic liquors; and careful regulation of diet. The skin must also be kept in good condition by baths and proper clothing.

The great difficulty in the way of preventing and overcoming the condition of auto-intoxication lies in the lukewarm assistance or direct antagonism of the patient, and to such should always be made clear the fact that the fight will be one of long duration and will call for the greatest patience and most persevering attention to details.

BACTERIURIA, WITH SPECIAL REFERENCE TO COLI BACILLURIA.¹

BY ARTHUR R. ELLIOTT, M.D.,
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THE constitution of human urine renders it an almost perfect medium for the growth and multiplication of lower forms of organic life. As a consequence, we find that to an unusual degree the urinary tract is subject to attack from bacterial forms of life, the resulting suppurative and infective processes possessing, with hardly an exception, the characteristic of excessive obstinacy. It is not the purpose of this paper to consider the bacteriology of the urine, but to discuss the comparatively little known condition termed "bacteriuria," the term being employed in the sense originally used by Roberts (*British Medical Journal*, 1881, Vol. 2, p. 359), to designate certain cases in which the urine is the seat of infection by micro-organisms without the urinary mucosa sharing in the process.

Recent discoveries have added much to our knowledge of the excretion of disease germs by the kidneys in the various systemic infections. It has long been known that toxins were excreted by the kidneys in most, if not all, diseases of infective nature, but until recently considerable difference of opinion prevailed as to the elimination of specific disease bacteria themselves, unless gross lesions of the kidneys existed; in other words, unless the filter was leaky. This point is now

fully established. A breach of continuity of the renal structure need not exist. The most important of the infective agents eliminated by the kidneys in disease are the typhoid bacillus, *Bacillus coli commune*, pneumococcus, and the tubercle bacillus.

The typhoid bacillus is present in at least one-fourth of all cases of typhoid fever, often in enormous numbers, in some cases the urine being a pure culture of the germ. The virulence of the bacillus is retained, being equal in one case observed by Richardson to that of a culture from the stools and internal organs. Pneumococci have been found in the urine in large numbers in pneumonia during the height of the fever (Kleinmann). The tubercle bacillus has been repeatedly demonstrated in the urine without pus being present in cases of miliary tuberculosis. Phillipowicz (*Wiener med. Blätter*, 1885, No. 22) discovered the bacillus of glanders and of anthrax in the urine of animals suffering from those diseases, and was able to cultivate streptococci from the urine in erysipelas and ulcerative endocarditis. Pyogenic cocci have been repeatedly demonstrated in urine free from pus, and Schweiger (*Virchow's Archiv*, Band 100, Heft 2) has proved that the urine of scarlatina and varicella may carry contagion.

While this elimination in the urine of specific germs in infective systemic conditions undoubtedly constitutes bacteriuria in the broad significance of the word, it is not within the meaning of the term as ordinarily used in clinical medicine.

The term bacteriuria, as originally employed by Roberts and Ultzmann, and as understood in clinical medicine, is meant to imply an infection of the urine by bacteria from some source within or tributary to the urinary tract itself. A distinction is therefore to be made between such cases and those instances just reviewed, in which the urine acts merely as a vehicle for removal of disease germs from the system. For a clear understanding of the condition known as bacteriuria it is equally important to eliminate those frequent infections of the mucous membrane of the urinary organs in which the urine teems with bacteria thrown off from their nidus of growth in the mucosa.

The symptom known as bacteriuria is therefore to be defined as a condition in which bacteria are excreted in large numbers in a pus-free acid urine, without any sign or symptomatic indication of cystitis or infective nephritis. When first voided the urine is cloudy, often lactescent and gives forth a putrid, revolting smell, which has been likened by Moulton to the stench of stale fish. The turbidity of the urine when voided, and the penetrating offensive odor are the characteristic symptoms of the condition. The opacity does not settle to the bottom of the vessel on standing, and cannot be separated by sedimentation in the centrifuge or by filtration through paper, although the urine may be rendered clear by passage through a porcelain filter or by thorough shaking with magnesium usta.

¹ Read at the Fifty-fourth Annual Meeting of the Illinois State Medical Society, Bloomington, Ill., May 18, 1904.

² Received for publication May 24, 1904.

The reaction of the urine is acid, and under the microscope the field is seen to be swarming with actively motile organisms. The sediment is small and contains no pus, or but a few rare pus leucocytes are to be discovered. Local urinary and general systemic symptoms are generally absent. In most of the cases observed this has been the rule, although a minority have shown vesical irritability, urinary incontinence (especially in children), and occasionally digestive and nervous symptoms have been present. The bacteria are mainly the *Bacillus coli commune*, often in pure culture. Jeanbeau (*Gazette des Hôpôt.*, June 24, 1899) collected 67 cases from the literature, in 56 of which the *Bacillus coli commune* was the infective agent. In the remaining 11 it was streptococcus, *Proteus hauseri*, or *Bacillus subtilis* alone or in combination. Barlow (*Deut. Archiv für klin. Med.*, Bd. 59, p. 347) gathered together from the literature and his own experience notes of 65 cases of bacteriuria. In these, *Bacillus coli commune* was present 19 times—17 in pure culture, twice with staphylococci. Of the remainder, sarcinae were present in 22 cases, staphylococci in three cases; in the remaining two, undetermined bacteria.

In five cases occurring within the writer's experience within the past two years, the *Bacillus coli commune* was the predominating bacteria, associated in three of the cases with common pus organisms.

Concurrence of clinical experience is in favor of the *Bacillus coli commune* being present in the great majority of cases, frequently in pure culture, sometimes associated with pyogenic microorganisms. The importance of the coli bacillus in the urine may be easily overestimated, because of the great frequency of its occurrence as a secondary infective element in suppurative diseases of the bladder and kidneys. In infective urinary diseases different forms of pus organisms may be abundantly present at first, and subsequently become entirely replaced by coli bacilli, which, because of their rapid growth, hide the original pathogenic microbe. This is undoubtedly the origin of many cases of coli bacilluria.

In the majority of cases of *Bacillus coli* infection of the urine there seems no difficulty in understanding how the organism gains access to the bladder. The path of infection is apparently the urethra, since urethritis, instrumentation or injection have usually preceded the bacteriuria. The writer is inclined to reject the idea of a direct infection by way of the urethra, normal or diseased. Undoubtedly the frequently preceding, urethritis stands in a certain casual relationship to the coli infection; not, however, in the writer's opinion, so much by direct infection of the urine *per urethram*, as indirectly, by preparing the soil through gonococcal involvement of the prostate and seminal vesicles, the subsequent coli bacillus invasion occurring from the bowel through the lymphatics into the inflamed prostate or vesicles. Coli bacteriuria is a comparatively frequent com-

plication of gonorrhea, especially of cases in which the deep urethra and prostate have become involved. Fuller (*Diseases of the Male Sexual Organs*, Lea Brothers & Co., Phila., 1895) particularly has called attention to the frequent existence of *Bacillus coli commune* in the seminal vesicles in chronic gonorrhea. The above view of the invasion of the urinary tract receives support from the fact that operations upon the rectum, fissures, fistulae and hemorrhoids, all of which involve a breach of integrity of the rectal mucosa, and prostatic congestion from irritation, predispose to coli bacteriuria, and in practical experience have been known to give rise to it without urethral aid. Additional testimony is afforded by the frequency of coli infection of the urine in prostatic hypertrophy during the later years of life. Moreover, the almost complete monopoly of this disease by the male sex incriminates the prostate and seminal vesicles.

That the bacteria in cases of bacteriuria find their way into the bladder by way of the urethra is negated by certain well-known facts. The *Bacillus coli* is one of the common inhabitants of the glands and foreskin, and of the vulva (in 50 per cent. of women, according to Melchior), and Winslow (*Journal Med. Research*, Boston, Dec., 1903) has demonstrated its existence on the hands of between five and ten per cent. of persons examined indiscriminately. Despite this ubiquitous prevalence of the germ, it has on investigation seldom been found in the normal urethra, or in that channel when diseased. It cannot, therefore, be counted as one of the common bacteria of the urethra. Moreover, statistics show that the *Bacillus coli* is the infecting agent in most of the cases of bacteriuria, whereas staphylococci are comparatively seldom present. We would expect the reverse to be the case, if the infection of the urine were from the urethra, since the staphylococcus is a common, and the *Bacillus coli* a rare, resident of that channel.

Barlow inclines to the belief that the infection often takes place from the bowel by means of lesions of the rectum, citing as causes such factors as fissures or lacerations of the anus, fistula in ano, and even severe massage of the prostate and seminal vesicles through the rectum.

Posner is in favor of the intestine in preference to the blood as the source of infection. In fact, it is only in certain rare cases, where local causes seem entirely lacking, that it becomes necessary to adopt the explanation of Rovsing, that the germs find their way into the bladder through the medium of the circulation.

Even more necessary to explain than the source of the infection is its seat. The bacteria certainly do not live only in the bladder, or the difficulty of removing the condition would be much less than experience proves it to be.

It is difficult to account for the retention of these organisms in the bladder in immense numbers for months and years without exciting inflammation. This may be explained by the fact that the *Bacillus coli* is not, under ordinary cir-

cumstances, a urea-decomposing bacteria, and consequently, as believed by Rovsing, it is innocuous to the bladder as long as free drainage is maintained. This germ, however, it is well known, differs greatly in virulence according to the source whence it comes, and it may be that there is some factor in its environment in the bladder which renders it to a large extent harmless to the tissues. The element which suffices to protect the bladder against infection is no doubt the periodic and complete emptying of its contents by micturition, so that the vesical epithelium is not subjected to prolonged contact with the bacteria. In cases where free drainage is interfered with, as, for instance in prostatic hypertrophy, cystitis speedily results.

In many instances bacteriuria gives rise to no local or constitutional symptoms. As a rule, however, it is accompanied by a peculiar urethral discharge, which may be more or less constant, or only present after efforts at defecation. This discharge may be continuous with gonorrheal flux, which has persisted for an undue period and gradually lost its specific character. Quite as frequently a decided and even considerable interval may elapse between cessation of the urethritis discharge and the appearance of that due to the bacteriuria. An important point is that this pseudo-gonorrhea resists all the usual means of urethral treatment.

In three instances of bacteriuria under the writer's observation, slight nocturnal and diurnal incontinence existed. If the infection is localized in the prostatic apparatus, the urine may present only intermittent cloudiness. Under such circumstances the first portion of the urine will be more or less clear, the second half being lactescent, or it may be only at the end of micturition, when there is energetic contraction of the periprostatic muscular fibers, that the urine shows the characteristic turbidity. In the experience of the writer, the bacterial cloud in the urine may be greatly intensified by "stripping" the prostate and vesicles by means of the finger introduced into the rectum.

Irregular constitutional symptoms may develop during the course of a bacteriuria. Digestive and nervous disturbances, lassitude and intermittent pyrexia are frequent. The occurrence of fever in these cases may be explained on the hypothesis of Boyer and Guinard, that so long as the epithelium continues in a healthy state the toxins produced by the bacteria while in the bladder are not absorbed, but if the toxins from any cause such as deficient drainage become concentrated, the epithelial cells being kept in contact with noxious substances lose their vitality, and absorption takes place, with resulting systemic reaction. Under such circumstances acute symptoms may arise which may even closely simulate typhoid fever, giving, however, no Widal reaction, but showing many coli bacilli in the urine.

The diagnosis of bacteriuria rests upon the presence in the freshly voided urine of an opalescent

cloud which cannot be removed by acidulation, filtration or sedimentation. The disgusting fetid odor of the urine is characteristic, and under the microscope large numbers of actively motile bacteria are to be seen. In cases in which the prostate or seminals are the seat of the infection, they are found to be tender to palpation, and yield upon pressure a milky fluid which drips from the meatus, and which, if caught upon a glass slide and stained, is found to be a rich bacterial culture, principally of *Bacillus coli commune*.

The prognosis of bacteriuria depends on the nature, seat and severity of the infection. The condition is always obstinate to treatment—seldom is recovery rapid and complete. In proportion to the extent which the prostate and seminal vesicles are infected is the prospect of recovery prejudiced. The cases in which no infection of these organs can be made out are distinctly more favorable. A strong tendency to relapse exists, and must be carefully considered in framing a prognosis.

An important part of the treatment of bacteriuria consists in the improvement of the patient's general condition by hygienic measures, a full generous diet, careful regulation of the emunctories, and the administration of iron and other tonics as they seem indicated. Urotropin (hexamethylene-tetramin) should be given and continued perseveringly in a routine manner, from twenty to forty grains daily being administered, in divided doses.

Local treatment consists in the correction of any local complication which may exist. Urethral stricture, hemorrhoids, rectal fistula and fissure should be searched for and treated when found. Free drainage from the bladder is most important, and if from any cause, such as prostatic hypertrophy, the bladder is imperfectly emptied by natural means, the catheter must be employed as frequently as may be required to relieve symptoms due to retained urine.

The prostate and seminal vesicles should be carefully examined as to size, tenderness and consistency, and the character of the "strippings" from these organs is to be carefully investigated bacteriologically. If the prostatic apparatus is found to be the seat of infection, the greatest benefit will result from local treatment of these organs. Gentle massage of the prostate and stripping of the vesicles by means of the forefinger introduced into the rectum, should be systematically carried out once every four or five days. The greatest gentleness must be employed in performing these manipulations in order to avoid setting up local reaction through traumatism. A clean sigmoid and colon is to be provided for by means of periodic high enemata taken in the knee-chest position.

Local stimulation of the deep urethra by means of silver solutions appears to be of little avail. If the bladder is irritable, or pus leucocytes exist in the urine sediment, lavage of the bladder, with mild antiseptic solutions, is indicated.

THE USES OF X-RAY IN MEDICINE AND SURGERY.¹

BY RUSSELL H. BOGGS, M.D.,
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THE X-ray has two very important places in medicine and surgery, first as a diagnostic agent, and secondly as a therapeutic agent. At present I believe it is generally accepted that the therapeutic uses of the X-ray even exceed those of the diagnostic.

In this paper I will not mention technic any further than to say that it is just as essential that the X-ray operator should have mastered the minor details and be as accurate as a surgeon operating, or a physician prescribing the most powerful drugs.

I have been interested in the X-ray almost ever since its discovery, and during this time have visited many of the American and European hospitals. When I saw that a physician's work excelled along some lines, I inquired carefully into his technic and found his results due to accuracy and other details.

When the X-ray was discovered many physicians placed a machine in their offices and thought all they had to do was to turn on the switch and make a diagnosis without even being familiar with the apparatus, but it was not long before they found out their mistake and most of them discarded the X-ray as a diagnostic agent. But now, with the improved apparatus and better technic, you all know what can be accomplished.

The same is true of radiotherapy. When a few cases of carcinoma and lupus were reported cured it was natural for many to place machines in their offices for therapeutic purposes, and a large proportion of these have never made it a study and perhaps have only used the rays in a certain line of cases. Then the physician when he would see it recommended by someone for a different disease would treat the first two or three cases that came without first making a study of the technic used by the operator.

As a rule, the physician reporting cases does not give much of his technic, and then when results are not obtained, the X-ray is blamed and not the operator's methods. When we are not able to produce the same results that are reported by another, we should consider first the degree to which the tissues are involved, and our technic, and the way I have been doing it is to visit the physician and learn more about his methods, instead of condemning the treatment.

It is natural that there is a greater difference in the methods of treatment used by the various radiotherapeutists than any other class of physicians, due to the short time radiotherapy has been employed. A surgeon does not condemn intestinal anastomosis because he is unable to perform the operation. A knowledge of the X-ray cannot be obtained in a week or two. I do not believe there is another specialty which requires more careful and hard study than radiotherapy.

The X-ray tube can give a light that will only travel several inches from the tube, or it can give a light that will fluoresce on a screen and show the bones of the hand 175 feet from the apparatus. These rays seem to have a different place therapeutically, the rays from the low tube are very active and have a more destructive action on the tissue, while those given off the higher tube are more stimulating. Every high tube gives off both kinds of rays, and might be compared to a shotgun prescription, as ordinarily used.

Freund states that "it is very likely, just as white light is composed of several colors, Roentgen rays may be composed of various kinds, which may differ from each other in penetrative power as in their physical and physiological effects." The quality as well as the quantity is likely accountable for the results of different operators.

In speaking of the cases which come under X-ray therapy I will classify them under four heads:

1. Those cases which respond readily and as a rule do not need surgical interference; viz., lupus, epithelioma of the face, acne, eczema and tuberculous glands.
2. Those which should be treated for a short time, the mass removed and then continue X-ray treatment to prevent recurrence, viz., carcinoma.
3. Those cases of carcinoma which are considered inoperable should be treated to prolong the patient's life and make him more comfortable.
4. Tuberculosis. Many of these cases in the initial stage respond to X-ray treatment. But here the X-ray should only be considered a useful adjunct.

The treatment of certain skin diseases, namely, lupus, acne, chronic eczema, etc., has reached a stage where it is recognized by many of the leading authorities, as the most effective treatment. However, in the treatment of many skin diseases, it is better to use Finsen light or high electricity in connection with the X-ray.

In this connection I will report a case of acne. Miss B., aged twenty-five years, had acne for ten years, and during this time had been under treatment almost continually. The X-ray treatment was given until some dermatitis was produced and then high-frequency electricity from an Oudin resonator, using a high vacuum electrode, was given. The treatment lasted three months, when the acne had entirely disappeared. I have treated several cases over a year ago, and so far there has been no recurrence of acne, where the treatment was continued for sufficient length of time.

It has been continually said that mammary carcinoma should have postoperative treatment with the X-ray in order to prevent recurrence. This is certainly true, but I believe in certain cases it is more important to treat the case a short time previous to the operation and more particularly so if there is considerable glandular involvement. The disease in the axillary glands can usually be cured in four to six weeks, then the

¹ Read before the Indiana County Medical Society.

mass removed by the surgeon and it will not be necessary to remove the glands.

I have thus treated four cases with excellent results. Also, I have been inquiring from other physicians who are using the X-ray, and many of them say this would coincide with their experience. Now, I do not advocate the surgeon leaving diseased tissue, even if it is necessary to remove all the glands after the X-ray treatment given previously to the removal of the breast.

The other day I had a case referred for an opinion, as I have had many times in the past, to ascertain whether it was an X-ray case or whether it should be treated surgically and then receive X-ray treatment. This case, like many others when they came to the surgeon, had axillary involvement, and one of the glands was as large as a hickory nut. Now, it is reasonable when the glands in the axilla are of this size and the cervical glands are slightly affected, that there is likely to be some involvement of the mediastinal glands, and if the breast, muscles and all the glands are removed, as most surgeons will say at once, will there not likely be a recurrence within six months?

In the last three years I have had referred to me over 20 cases of recurrent carcinoma of the breast. The external signs of the disease in many cases disappeared within from six to twelve weeks, and still in many of these cases the process only retarded, that is, they are cured as far as the external signs of the disease are concerned, but there is often sufficient involvement of the mediastinal and bronchial glands to kill the patient in course of time before coming for treatment. However, the process may be retarded for months. To prove that the X-ray had nothing to do with the involvement of the mediastinal and bronchial glands, I have taken radiographs of the patient's chest at the beginning, and showed these glands to be involved.

I understand that many dermatologists who are not having their cases of epithelioma treated with the X-ray in order to prevent recurrence, use an arsenical paste after the operation to go further into the tissues and destroy the particles which they say are nearly always left. So it seems after careful consideration that every patient should have the benefit of the X-ray when carcinoma is to be treated.

The combination of operation and X-ray gives the patient all the benefits derived from the two best methods. There is no need for delay after the operation in giving a few treatments, but while these treatments should be given in fair doses it is not advisable to continue raying to a point where it will injure the healthy tissues. However, it is a well-known fact that the healthy tissues do not burn as readily as the cancerous. Therefore, it is very important to select the proper dose for each case. It is certainly advisable in treating inoperable cases not to crowd the treatment with the idea of effecting a cure at least in a short time, as by so doing you will break down tissue, and

the system will be flooded with toxins with which it will be unable to cope.

This is one of the reasons why some few have opposed the treatment in favorable cases.

In this connection I will report several cases:

Case I.—Mrs. B., aged thirty-eight years, was referred for X-ray treatment on account of the severity of the cancerous condition of the breast. The glands in the axilla were involved extensively, the cancer in the breast had begun to break down, and there was some discharge. The case was treated daily with X-ray for three weeks, when considerable dermatitis was produced. The discharge was checked, the mass in the breast was reduced in size, and the enlarged glands in the axilla had almost entirely disappeared when the patient was operated upon by Doctor Farree, six weeks after the first X-ray treatment. The doctor said he could see that the effects of the X-ray extended deeply into the tissues. Microscopical examinations confirmed the diagnosis. The patient was given a few postoperative treatments and made a good recovery. It is now eighteen months since the operation and there is no sign of recurrence.

Case II.—Mrs. J., aged forty-three years, had a cancerous mass in the breast and some axillary involvement when she started the X-ray treatment by a physician in another city. When she came to my office I advised a removal of the mass and then continue the X-ray treatment. This was done, but after the operation she took only twelve X-ray treatments. It is now a year since the last treatment was given. The patient has had no recurrence, and from the nature of the case a recurrence was expected. I report this case to show the effect of treatment given before operation.

Case III.—Mrs. B., aged fifty years, had extensive involvement of carcinoma in the breast and some little glandular involvement. I had the opportunity of examining this patient before she was operated upon, as her physician wanted the X-ray used afterward. Three weeks after the operation she came for X-ray treatment and at that time her arm was considerably swollen and her shortness of breath and slight cough showed that she had mediastinal involvement. Previous to the operation the arm was not swollen, nor had she any tendency to cough, she had always been entirely healthy. The patient has been treated six weeks with the X-ray and has improved somewhat, the cough has almost disappeared, and the arm is not swollen nearly so much. In this case I do not expect a cure, but only to prolong the patient's life. From what I have seen in my own work, and also in cases which have been related by other men, I believe this patient would have made a recovery, or at least would not have had any swelling of the arm if she had been treated a short time before the operation, as here the physical condition was better than in either of the preceding cases. This is a point to be considered in the treatment of carcinomatous growths.

Case IV.—Mrs. B., aged thirty-five years, had been operated upon for carcinoma of the breast

six months before she had a recurrence. The breast, muscles and glands had been removed. When she came for X-ray treatment there was considerable involvement of the tissues of the chest walls. Treatment was given every day for ten days, afterward three times a week for a period of two months, when all the external signs of the diseases had disappeared. When she came I took a radiograph of the chest, which shows the mediastinal and bronchial glands were involved. The treatment will prolong her life, but it can hardly effect a permanent cure.

Hyde, Montgomery and Ormsby, in the *Journal of the American Association*, in speaking of epithelioma, say: "Of fifty-five cases of carcinoma of the skin treated by us with radiotherapy, the majority were of the superficial type, known generally as epithelioma or rodent ulcer. The value of the X-ray in the removal of such growths is so generally recognized that we shall give here a summary of our observations, together with a brief outline of a few typical and otherwise interesting cases. In the superficial form of carcinoma our results have been quite uniformly successful."

I believe this report of Drs. Hyde, Montgomery and Ormsby will coincide with the reports of a large number who are employing the X-ray. However, I do not believe it is wise to continue the X-ray treatment of epithelioma for more than six weeks, unless considerable improvement has taken place; then diseased tissue should be removed at once. But, I believe that cases that have not responded to X-ray treatment in most cases have been treated by a tube which was too high in vacuum. I know of such a case which had been treated for some time and no results produced. The patient went to another operator who used an extremely low tube, and six treatments in two weeks produced the desired amount of irritation, and within four weeks the epithelioma had entirely disappeared.

MEDICAL PROGRESS.

MEDICINE.

Etiology of Pneumonia.—The examination of healthy lungs have convinced H. DÜCK (*Münch. med. Woch.*, June 28, 1904) that a large number of bacteria, including the pneumococcus, are almost constantly present in the alveolar spaces. In certain animals the filtering apparatus of the upper air-passages is very perfect, but in man even coarser particles reach the lung and give rise to the well-known discoloration. Another factor thus must be active to set up an inflammation, and this the author believes to be sudden exposure to cold. If a pure culture of pneumococci is blown into the lungs of animals nothing will usually happen, but if the animals are first chilled by placing in ice-water, a pneumonia results almost invariably. Autopsy shows a typical lobar consolidation.

Excretion of Iodine with Iodipin.—The greatest disadvantage of administering iodides is the rapid excretion, so that fairly large amounts must be given in frequently repeated doses, with the result that iodism is common. The excretion begins in half to several minutes and ceases in about thirty-six hours after one

gram, after about 80 per cent. has passed into the urine with iodipin. H. SINGER (*Zeitsch. f. klin. Med.*, Vol. 52, Nos. 5 and 6) found only about 60 per cent. in the urine and the excretion was continued over four to five days. With rest and abundant food the excretion is slower than if the patient is active and insufficiently fed. As with the iodides the largest amount of iodine is found in the urine directly after injection, but the excretion has a tendency to be more uniform.

Infusions in Pulmonary Tuberculosis.—A very extensive research on this subject has been made and is now published by JACOB, BONGERT and ROSENBERG (*Dent. med. Woch.*, No. 28, 1904). Their study is both experimental and clinical and the technic of their method as applied to the human subject is as follows: The laryngeal surface of the epiglottis and the vocal cords is anesthetized with a 20 per cent. cocaine solution. Shortly after a thin tracheal rubber spray tube is introduced through the glottis and through it the trachea is sprayed with several c.c. of a 2½ per cent. solution of β -eucaine. The coughing which is apt to follow does not usually last very long. A bougie, provided with a very flexible stilet, is then introduced into the trachea. When this is in place the stilet is removed and the bougie may then be carefully pushed down into either bronchus. A syringe containing the tuberculin is attached to the bougie and the fluid slowly injected. The amount was usually about 20 to 30 c.c. of a solution of 0.01 to 0.02 of the tuberculin to 100 of water. As the reaction to the tuberculin disappears, the quantity of tuberculin is increased. After treatment, the patients are put into the horizontal position, as it was found that in this way the fluid found its way into the upper parts of the lung. The authors claim that after a little experience this procedure can be completed in about ten minutes, and is well borne by the patient. The method was applied in five cases, all of which were in poor general condition and in the second stage of the disease. The infusions varied in number—in one 38 were given in the course of four and a half months; in another 18 in two and a half months. The results are reported to have been excellent and the patients were considered to have been clinically cured,—the physical signs having disappeared, symptoms being relieved and an increase in weight noted. The method was apparently harmless, as no unpleasant after-effects were noted. It is also claimed that the procedure will have a diagnostic, in addition to its therapeutic value. It was found that if an individual was afflicted with tuberculosis, the injection of the tuberculin, as described, will be followed by a reaction if only 1-10 or 1-12 of the dose is given which would be necessary in order to obtain a reaction by the subcutaneous method. If the tuberculous process is localized in some other part of the body than the lungs, the reaction after the infusion will only appear after an equal or greater dose has been injected than would be required for subcutaneous injection. A special monograph is about to be published by the authors, which will contain a more detailed description of their researches.

SURGERY.

Congenital Elevation of the Scapula.—An interesting contribution to the etiology of this subject is contributed by H. J. LAMERIS (*Archiv f. klin. Chir.*, Vol. 73, No. 2), who reports in detail a case where examination disclosed a tense band extending from the angle of the scapula to the tip of the fourth spinous process. An operation showed that the band was a portion of the lower segment of the rhomboides muscle which had undergone connective tissue changes and become con-

tracted. After extirpation of the band, the deformity partially disappeared and the motion of the arm was less interfered with. The author believes that some lesion of the rhomboideus muscle was the cause of the scapular elevation in his case, and he considers the condition analogous to that seen in the sternomastoid in congenital wryneck. Similar observations made by Sain-ton, Kirrnisson and Roger, seem to show that a lesion of this nature in the rhomboideus muscle plays a very important part in the production of scapular elevation. The variety of positions assumed by the scapula in this condition can be explained by assuming that a contraction of either the upper or the lower part of the muscle pulls the bone in one direction or the other. The diminished rotation of the scapula can also be explained by the same reasoning.

Subcutaneous Alimentation.—Artificial methods of giving nourishment subcutaneously is discussed by P. L. FRIEDRICH (*Archiv f. klin. Chir.*, Vol. 73, No. 2). This method has been advanced as of particular value in abdominal surgery and the author has used it with success in several cases of peritonitis, gastric and intestinal perforation. He used the preparation devised by Prof. Siegfried, designated as pepsin-fibrin-pepton, which may be readily sterilized and remains so for several weeks. The maximum dose is about 20 gms. daily. He has employed it from ten to fourteen days and succeeded in tiding these patients over until nutriment could be given by other channels.

Tuberculosis and Osteomyelitis of the Patella.—This condition is exceedingly rare, for among the large number of surgical cases at the clinic in Jena during the past fifteen years, W. ROPKE (*Archiv f. klin. Chir.*, Vol. 73, No. 2), reports only eight cases of primary tuberculosis and two cases of osteomyelitis of the patella. Young persons seemed to be the most often affected. The diagnosis of a suppurating or a tuberculous focus in the patella depends on the localization of the focus and the involvement of the joint and the overlying soft parts. As soon as the diagnosis of either condition is made operative interference is imperative on account of the danger to the joint. This may become ankylosed or secondarily affected with tuberculosis. If perforation of an osteomyelitic focus has already taken place into the joint, and a suppurative arthritis resulted, the focus in the patella must be thoroughly cleaned out and the joint punctured and drained. It may thus be possible to obtain more or less mobility in the joint. If the tuberculous process in the patella is combined with a similar one in the knee-joint, and a resection of the latter is done, the question as to what disposition is to be made of the patella depends on the extent of the lesion in this bone. It may be either totally extirpated or retained for the purpose of filling up bony defects in the femur or the tibia, which have resulted from the excision of diseased bone.

Soap Tinctures for Cleansing the Hands.—An interesting article on this all-important subject is presented by R. FALCK (*Archiv f. Chir.*, Vol. 73, No. 2). His experiments have been made with the spores of molds. These spores may be divided into two types which behave differently toward antiseptics. The one variety is coated with a film of air which defies all watery solutions, but is readily susceptible to strong alcohol, and the underlying spore is quickly killed. The other variety has a mucous or gelatin coating, which resists alcohol in the dry state, but is readily affected by watery germicidal solutions. The writer believes that a similar condition applies to bacteria and that a combination of the alcohol and watery germicidal solution is necessary to produce complete disinfection of the skin. The latter

process must be based on a combination of mechanical cleansing with chemical disinfection. The first part should consist of the application of an alcoholic solution of soap, as this will penetrate deeper into the skin than the watery solution. The alcohol, however, must not be too concentrated, otherwise a contraction and hardening of the epidermis results, which renders it impervious to the action of the soap. An alcoholic soap solution, moreover, removes the air and emulsifies the fats, in this manner bringing the germs in the skin into the field. In addition those spores are moistened, which resist to a greater or less degree the action of water, and are then destroyed. The remaining spores are also rendered more susceptible to the action of the succeeding watery solutions. These indications have been met by the author in a soap which on the addition of water forms a "tincture" of the following composition: Soda soap, 15 per cent.; water, 15 per cent.; alcohol, 70 per cent. The process of washing the skin is divided into three parts: (1) The soap is softened with a little water and rubbed thoroughly into the skin; (2) this is rubbed up into a foam with water; (3) after rinsing, disinfection with lysol or corrosive sublimate. The author has had good results with this method, especially in getting rid of the spores of molds.

Newer Methods of Opening and Closing the Abdomen.—There is no more remarkable fact in surgery of the present day than the want of unanimity existing as to the best method of opening and closing the abdomen in abdominal operations for pelvic diseases, remarks E. HASTINGS TWEEDY (*Brit. Jour. of Obst.*, June, 1904). The vertical incision is still the operation of choice among British surgeons, but upon the continent the transverse incision has largely superseded it. In the transverse incision, a slight curve is made with the convexity toward the pubis and through the skin, adipose tissue and sheaths of the recti. The structures are raised as a thick flap above and below the incision, from the muscles lying below them. The divisions between the recti can now be clearly made out; the latter are separated and the abdomen opened in the usual manner. The advantages of such an incision are manifest. In the first place, it runs in the direction of the elastic fibers of the skin; as a rule the parts fall naturally into position on the completion of the operation, and the fear of hernia is reduced to a minimum, the severed aponeurosis is, throughout the greater part of its course, protected by the muscles, and it is only the transverse slit extending between these, that could by any possibility, permit of the escape of the abdominal contents. The application of a few interrupted sutures, superficially placed in the muscles, sufficient to keep them in apposition until adhesions form between them and the overlying fascia, will eventually prevent the occurrence of hernia. The scar left after such a wound has no tendency to spread. The prevention of hernia is entirely dependent upon the proper technic, which is followed in the closure of the abdominal wound, the main objects of which should be strict asepsis, careful apposition of the more important abdominal layers, and lastly, the prevention of subcutaneous hemorrhage. It is a safe precaution to close off the peritoneum by means of a continuous suture of fine silk. To keep the muscles in close apposition their external sheaths should be sutured, which the author formerly did after the method of Howard Kelly, but now a continuous layer of silk is employed, as it can be more rapidly introduced. In the closure of the skin wound, a subcutaneous suture of silk-worm gut is placed in the usual manner and either end is threaded through a thin lead plate which is placed over the long axis of the wound. Aseptic dressings are

placed over the plate and an abdominal binder is applied in the usual manner, the parts being left undisturbed for fourteen days. The plate affords a ready means of preventing the cuture slacking, and does not permit the wound to pucker. The author is convinced that the lead itself exercises a favorable influence on the healing process, for otherwise it would be difficult to account for the perfection of the scar.

Clamp and Cautery in Appendectomy.—The abscission of the appendix and disposition of the stump are the two most important steps in appendectomy. The method probably employed by most surgeons is to ligate the meso-appendix and neck of appendix, invaginate the stump into the cecum after treating it with some antiseptic, and secure it by a pursestring or Lembert sutures. Another much-used method consists in turning down a cuff of peritoneum, pulling up the other coats and ligating these at the base, abscising, permitting the stump to retract and suturing the peritoneal cuff over the stump. J. R. EASTMAN (*Am. Jour. Obst.*, July, 1904), calls attention to objections attendant upon both of these methods. A circular ligature about the base of the appendix, either internal or external to the serosa, does not permit of exploration to determine the patency of the canal of the stump. Should such a ligature be placed beyond a stricture, conditions are established favorable to a fresh attack of inflammation. Some surgeons do not apply an external circular ligature, but cut the appendix, compress the proximal end, and after sounding the canal, invaginate, securing the stump with Lembert or pursestring sutures. This method is especially dangerous when the tissues are thickened or friable, or, if there is extensive suppuration, for in such conditions there is great likelihood of escape of the contents of the appendix or cecum. The writer advocates the use of a light clamp with broad accurately-fitting shields to be applied to the base of the appendix close to the cecum. Such an arrangement would preclude the possibility of pus from the appendix or cecal wall contaminating the neighboring serosa or floating into the peritoneal cavity. The appendix should then be severed with the cautery just above the clamp, the shields protecting the neighboring structures from the heat. Whatever fluid contents that might have escaped, will have been rendered sterile by the cautery. When the shields and clamp have been removed, a thin seared edge remains which may readily be invaginated. Additional advantages claimed for this method are, that the shields hold back coils of intestines, hemorrhage is minimized and the time of operation materially shortened.

NEUROLOGY AND PSYCHIATRY.

Examination of the Cerebrospinal Fluid in Nervous Diseases.—In order to determine the value of these examinations in the diagnosis, E. SIEMERLING (*Berl. klin. Woch.*, May 23, 1904) has made an extensive series of observations, in which not only the histological characters, but also the physical and chemical properties of the fluid were considered. Lymphocytosis, when taken in connection with other symptoms, has usually been considered as indicative of meningeal irritation. Thirty-eight cases of progressive paralysis examined showed a lymphocytosis in all but one. It may, therefore, be considered as one of the early symptoms. In epilepsy and simple melancholia, negative results were obtained. In all cases of organic and nervous diseases, a well-marked leucocytosis was present, but was absent in pure neuroses and apoplectic dementia. In a case of extradural hemorrhage, the red color seen in the specimen of cerebrospinal fluid remained after the specimen was centrifuged. In another instance where the bleeding took place into and

broke through the floor of the third ventricle, the fluid remained clear after the blood had settled to the bottom of the tube.

Polyneuritis and Landry's Paralysis Following Influenza.—E. BRACCHI, in *Gazz. deg. osped.* (June 26, 1904), says that the modern conception of intoxication, whether bacterial or biochemical, to which the nervous system is especially susceptible, has assumed a definite form, namely, as a polyneuritis or an ascending paralysis. Acute infectious diseases conquer the most variable nervous disorders, both in symptoms and location of lesion, the commonest and one of the most serious in its results is influenza. Two cases of Landry's paralysis show new evidence of the toxic nature of influenza, as well as a contribution to the rare complications of influenza. Case I.—A child, aged nine years, suffered from influenza in 1899, recovered, but shortly after developed a paraplegia, and next an ascending paralysis of the trunk and arms, the paralysis being flaccid. Next bulbar, respiratory and cardiac symptoms appeared. The third nerve was paralyzed. Normal cutaneous sensibility was present, except for some paresthesia and delayed sensation. The tendon reflexes progressively disappeared. The sphincters are normal, the temperature not much elevated. Twenty-five days from the onset the symptoms began to disappear in the inverse order of their invasion, leaving great weakness and muscular flaccidity. No trophic disturbance appeared at any time. Complete recovery came after eight months. The second case, a child of two years, suffered from a descending form of Landry's paralysis, occurring during the influenza epidemic of 1899. The child developed a gastrointestinal type of influenza, and some days later difficulty of swallowing and rapid respiration developed, saliva accumulated in the mouth, and the lips and palate were partially paralyzed. Next the arms became paralyzed, then the trunk and legs. The cranial nerves did not present noteworthy symptoms. The reflexes were absent, sphincters intact, electric reaction unaltered, the skin sensibility was normal, there was marked cyanosis. After fifteen days the bulbar symptoms increased and the patient died of respiratory paralysis. The third case was polyneuritis in a man, about fifty years old, following influenza. In conclusion, the writer notes the predilection of the toxin of influenza to attack the nervous system, even a long time after the acute symptoms have passed. Landry's paralysis has been noticed after typhoid, tuberculosis, syphilis, puerperal fever and measles.

Brachial Neuritis.—This very important topic has been accorded scant courtesy in most of the text-books. CHARLES W. BUCKLEY (*Lancet*, April 16, 1904) states that, aside from injury, gout is undoubtedly the most important etiological factor in producing this symptom. In men the neuritis is often accompanied by the ordinary manifestations of gout, whereas in women, these are apt to be irregular and difficult of recognition. Duplay records the following changes in the joint: (1) Chronic subacromial bursitis and subdeltoid cellulitis with obliteration of the bursa and formation of adhesion between the deltoid and the humerus; (2) chronic inflammation of the capsule leading to thickening; (3) periarticular cellulitis internal to the joint leading to formation of fibrous tissue; (4) congestion of the ulna and internal cutaneous nerves; (5) atrophy of the deltoid. Weir Mitchell says any form of nerve lesion is capable of developing in the joints inflammatory conditions, usually subacute, which so precisely resemble rheumatoid arthritis that no clinical skill can distinguish between the two. The prominent symptoms are pain which varies in

degree, but which may be very severe; tenderness to the affected nerve trunks and of certain cutaneous areas related to them; weakness of certain muscles and limitation of movement; trophic changes, rarely severe and sensory changes, anesthesia and hyperesthesia which often persist after the other symptoms have disappeared. The diagnosis from angina may be very difficult. Aneurism again is a possible source of error and tumors of the cervical spine or of the bones and shoulders may cause pressure on the nerves so as to closely simulate neuritis. Prognosis is variable, the duration being probably never less than three or four months, and disability may extend over a year or more. The older the patient the more difficult the case. Recovery depends largely on the amount of rest obtained. Young people recover more readily than old. Relapses are not infrequent. A sling is occasionally useful, but much better results are obtained by bandaging the affected limb to the side. As most of the cases are of gouty origin, they should almost be put on antigout treatment. Free blistering along the infected nerve trunks is often very serviceable and galvanism may be a valuable aid in the mitigation of pain. Massage is positively contraindicated as long as there is any acute inflammation.

Uremic Aphasia.—The history of paralysis due to uremia is comparatively recent. Lesegue denied it. Trousseau considered it probable. Lancereaux was the first who in 1875 admitted the possibility. Brunet in 1893 published a clinical observation of uremic aphasia. In 1894 Dufre reported ten such cases. BRETON (*Gazette degli ospedali*, April 12, 1904) reports a case of a man of forty years who in the course of Bright's disease, albuminuria 5 grains to 1,000, was taken by a short attack of incomplete paralysis of the right arm and leg. Motor aphasia, without word deafness, word blindness, nor amnesic aphasia was present. The patient, understanding all that was said to him, and showing no mental confusion. Agraphia was present, but only of the paralyzed arms, as the patient could pick out letters of the alphabet to express his thought. The paralysis improved, but the aphasia persisted. The albuminuria disappeared. In literature uremic aphasia has been described as intermittent, as in other toxic aphasias, and benign, and it was said that it would not persist even in fatal hemiplegias. In the experience of Breton, it is not unusual for the paralyzed limbs to rapidly regain their function, but the aphasia remains invariable unto death. Usually uremic aphasia is accompanied by agraphia and word blindness. Localized edema of the brain, cerebral atheroma and local congestion may be present, caused by the toxic urinary products or ptomaines.

Disseminated Sclerosis Simulating Spastic Paraplegia.—Notwithstanding the fact that disseminated sclerosis is by no means a disease of infrequent occurrence, its diagnosis is at times quite difficult, the more so, as we seldom come across typical cases as described in the text-books. Pathologically the disease presents disseminated foci of sclerosed tissue in the brain and spinal cord, and there are no two cases that would, to any considerable extent, resemble each other. The etiology of the affection is uncertain; syphilis does not seem to play any part in it; more importance is attached to infectious diseases, especially smallpox and typhoid fever. The classical case, according to the French school, presents the following array of symptoms: Weakness in the lower limbs, tremor and attacks of dizziness; objectively muscular weakness in connection with rigidity of the lower limbs, increase of tendon reflexes, spastic-parietic gait, intention tremor, nystagmus, the well scanning speech, and finally apoplectic attacks, eventuat-

ing in monoplegia. The case of R. A. FRÄNKEL (*Prakt. Vrach*, No. 23, 1904), is rather atypical, inasmuch as the patient, a man of twenty-seven years, single, complained first of difficulty in walking, especially with his left leg, which has kept on the increase for the last two years. The patient gave a negative anamnesis as regards his family, while he himself underwent an attack of diphtheria when eight years of age, and later on passed through a severe attack of malaria, as evidenced from the enlarged spleen on palpation. The patient exhibits a typical spastic gait with the characteristic "gluing" of the toes to the floor; intention tremor in left arm and leg, no muscular atrophy, tendon reflexes very much exaggerated, bladder and rectum functioning normally, otherwise in symptoms mentally sound. At the expiration of three weeks after this examination patient again presented himself with a history of two severe attacks of dizziness accompanied by loss of consciousness of some hours' duration. There could then be no more doubts of the diagnosis of disseminated sclerosis, which had evidently first invaded the pyramidal tract of the lateral column, thus giving rise to symptoms simulating those of spastic paraplegia. The author inclines to malaria by the etiological factor in the given case.

Erythromelalgia.—The case as related by A. M. VIRSHUPSKY (*Prakt. Vrach*, Nos. 21 and 22, 1904), is that of a man who, since his twentieth year, when he had passed through an attack of scarlet fever, has been suffering from attacks of pain and pruritus around both wrists, followed by the appearance here and there of red spots of various sizes; this redness disappears under pressure, but reappears as soon as the pressure is removed; with this there is also swelling of the hands and fingers; the attack eventuates in sweating of the parts. The same phenomenon is observed around the ankle-joint, but to a less marked extent. The attack lasts for a few hours at intervals of several hours and sometimes of days or even weeks. The patient is otherwise perfectly healthy, and does not feel very bad even during the attacks, obtaining considerable relief by immersing the affected parts in warm water. The patient had subjected himself to various sorts of treatment but without any relief. His anamnesis leads the author to exclude alcohol and syphilis. The group of acroparesthesias is excluded in this case as the attack is not characterized by either anesthesia or hyperesthesia, nor any other disturbances of temperature. The author also excludes tarsalgia, podalgia, as well as the so-called alkinesia algera of Möbius. As the patient is but twenty-one years of age arteriosclerosis is excluded as the causative agency of the affection. Among the skin troubles that may simulate the disease under consideration of erythema exsudatum multiforme and erythrodermia (Pick, Kaposi and others) are mentioned by the author, but must be excluded for the lack of some symptom or other. Thus it remains to group the disease, the chief features of which are erythema, pain, edema, sweating and trophic disturbances (urticaria) all occurring in paroxysms and on symmetrically disposed localities,—as the angiotropho-neurosis described by W. S. Mitchell in 1878 as erythromelalgia. The disease is very rare (possibly not recognized?), as is evidenced from the fact that Oppenheim, notwithstanding his very extensive clinical experience, mentions but two cases seen by him. In the majority of the cases described erythromelalgia was met with either as complicating a general neurosis, or as a local manifestation of some organic disease of the nervous system (myelitis, tumors, gliosis spinalis, etc.), or again as a symptom of a peripheral disease of the nervous

system, and finally as a manifestation of arteriosclerosis. As causative agencies of the disease have been mentioned extreme fatigue of the extremities, climatic influences, rheumatism, preceding infectious diseases and so on. The author is inclined to consider the affection as due to scarlatina in his case. According to Senator the disease is pathologically an active hyperemia of the vessels resulting from paralysis of the vasoconstrictors or spasm of the vasodilators; while the symmetry of the affected parts leads him to consider it as a disease of the central nervous system. Eulenberg localizes the affection to the gray matter of the brain, in its posterior and lateral portions, and considers the symptoms of erythromelalgia as due to dynamic functional alterations of the corresponding ganglia resulting from their exhaustion or pathological condition. As regards treatment, little, indeed, can be effected. The patient (appropos, a pharmacist by profession) tried arsenic, pyramidon, ergotin, salicylate preparations, belladonna, anti-febrin, of which the last brought some relief for a few days only. Various hydrotherapeutic procedures are recommended, such as general or local baths, douches, salt water, compresses, as well as local faradic baths; The author considers the last as of some value. Operative interference (as resection of the ulnar, posterior tibial nerves, etc.) seems to have benefited some cases.

OBSTETRICS AND GYNECOLOGY.

Torsion of the Fallopian Tube.—It has fallen to the lot of most men who have operated on a considerable number of various tumors to come across an ovarian cyst with twisted pedicle, associated with hematosalpinx, produced by the torsion of a hydrosalpinx which was adherent to the ovarian cyst. Mr. Bland Sutton, according to HAMILTON BELL (*Brit. Jour. of Obst.*, June, 1904), was the first to record such a case and this in 1891. There is no single exciting cause in the production of this condition, but the presence of a solid tumor on a dermoid has been frequently noted. Here there must be a fairly long pedicle and a smooth peritoneum, free from all adhesions. Others suggest that the alternate emptying of the rectum and bladder may cause torsion, and this latter might produce a gradual twisting but never an acute strangulation. In most cases of pyosalpinx, the adhesions are numerous, and torsion is therefore impossible. Besides, in hydrosalpinx, there are particularly has insisted on the slow or chronic variety particularly, has insisted on the slow or chronic variety of torsion but it is by no means so common as the acute form. The number of twists varies greatly in the recorded cases, from a half turn (i.e., through 180°) up to 4½ twists. The actual number of twists is really of little importance. The usual tumor of the fallopian tube to undergo torsion is a hydrosalpinx, and it is transformed by the hemorrhage induced by the torsion into a hematosalpinx. Pregnancy does not seem to play an important part as a predisposing agent, as diseases of the tube are commonly associated with sterility, absolute or relative. The most prominent symptom, common to all cases, is abdominal pain, of a severe type, situated in the lower part of the abdomen. The pain is sudden in onset and very sharp, often leading to faintness and even syncope. Sometimes the pain radiates to the inguinal region and legs, to the hypochondrium, or to the loins. This has led to wrong diagnosis, such as appendicitis. There is usually little or no interference with menstruation. Peritonitic symptoms are well marked. Vomiting is commonly noted, of varying severity, but never fecal. Frequency of micturition is occasionally present. The presence of a tumor in the

abdomen is very characteristic of this lesion. Vaginal examination is useless, unless the tumor is located in the pouch of Douglas. In the fifty cases reported an absolute diagnosis has never been absolute before operation. There is usually an exploratory operation performed for a tentative diagnosis of salpingitis or appendicitis. The treatment is necessarily surgical, and the abdominal is the correct route to operate by. The prognosis after operation is favorable. So far only three deaths have been recorded from such treatment.

Case of Quintuplets.—For the specimens and history of this most interesting case, G. C. Nijhoff (*Brit. Jour. of Obst.*, July, 1904), is indebted to Dr. J. J. Blécourt, of Hees, Netherlands. The mother was a healthy, robust woman, aged thirty-four years. Seven years previous to the present conception she had been delivered of a male child. The last menstruation was January 20, 1903. In March there was, for a few days, a slight discharge of yellowish fluid, tinged, at times, with blood. The quickening was first felt early in June. At 8 o'clock P. M., July 12, labor pains began. At that time fetal heart sounds could be heard at both sides and in the middle of the abdomen. The fundus uteri was a hand's breadth above the umbilicus. At 8.30, soon after the rupture of the membranes, an immature, but living, female child was born, followed in ten minutes by a second child (female). Some minutes after the birth of the second child, a new bag of waters was made out. At 9 o'clock a third child, a male, was born, in a vertex presentation, soon followed by a fourth child, a female, in footling presentation, with back anterior. Within a few minutes the fifth child, a female, was spontaneously born in footling presentation. The five children were alive, but immature, and survived only one hour. During the puerperium no untoward symptoms appeared, other than an increase in temperature (37.9 C.) on the third day. Immediately after birth the combined weight of the five children was 3,150 grams. The placenta was single, oval in form, with a transverse diameter, 18.5 CM., and longitudinal diameter of 25 CM. Its thickness varied from 0.4 to 3 CM. Its weight was 890 grams. At its fetal side five separate umbilical cords were inserted, each by a distinct sac formed from the fetal amnion, three of these sacs were enclosed by a common chorion. The two others had a separate chorion. The author thinks that these quintuplets may be regarded as the product of the fecundation of three ova. In the mother's family several cases had occurred of multiple pregnancy. Her mother once had twins among other children. Two maternal uncles became fathers of twins. A maternal aunt was delivered of triplets. There were no cases of multiple births in the father's family.

Significance of Fever During Labor.—The etiology, course and prognosis of fever coming on during labor, have been carefully studied in a series of 200 births in the clinic at Königsberg by E. Ißm (*Zeitsch. f. Geb. u. Gyn.*, Vol. 52, No. 1). Primiparae seemed to be most often affected (43 per cent.). Other etiological factors were narrow pelvis or rigid soft parts, improper position, prolonged duration of the labor, early rupture of the membranes. The prognosis for the puerperium was shown by the following: 41.5 per cent. continued to have a temperature, 8 died (5 of sepsis), 26 developed a severe puerperal fever. The effects on the children were shown by the fact that 36 per cent. died. Therapeutic indications point to measures for the purpose of hastening delivery. For this he suggests hot vaginal douches, dilatation of the cervix by rubber bags or Bossi's instrument, version, forcing the head into the pelvis and applying the forceps, rupture of the membranes. Version he considers a rather dangerous procedure.

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SATURDAY, AUGUST 20, 1904.

THE SEGREGATION OF URINE.

THAT this difficult task is one of the most important to deal with accurately, in every case of suspected surgical renal involvement there is not the slightest doubt. If there were, the multiplicity of instruments and methods for establishing this segregation must convince the disbeliever of his fallacy.

Albarran, of Paris, one of the greatest of genito-urinary surgeons, was the first to popularize the catheterization of the ureters. In the male this technic is extremely difficult, calling invariably for the hand of a thoroughly trained expert. Six years ago there were few in New York who could do this catheterization with any degree of certainty or rapidity. To-day, of course, there are a number of men who experience no difficulty in the average case and with the assistance of improved instruments readily pass the ureterovesical valve. Nature's arrangement of this admirable barrier to the outside world speaks trumpet-voiced in disfavor of ureteral catheterization. A technic so thoroughly at variance with her plans and methods for the protection of the organism against invasion from the outside, could have but one ending. Thus it is that ureteral

catheterization for the most part has had its day and is passing.

Lambotte, of Brussels, constructed a rude instrument in 1890 which was the precursor of Harris's more perfect device. The segregator which he devised is of extremely ingenious construction. It depends upon the principle that the base of the bladder may be lifted by a tent-like structure, which is introduced into the rectum. This creates two lakes, one on either side of the ridge, each one having a ureteral opening near its center. Moynihan, in an article on intravesical separation of the urine, in the *British Medical Journal*, July 2, 1904, states that while Harris's instrument is most ingenious in construction, in actual working it is found not to be strictly reliable.

In order to gather a sufficient amount of urine for differential purposes, the segregator must remain in place for at least twenty minutes or half an hour,—the period of time being determined by the rate of urinary secretion. Its introduction and its tolerance for this length of time is confessedly annoying and disquieting to the patient.

Moynihan, in his article referred to, pictures the intravesical urinary separator of Cathelin and of Luys. These instruments differ only in the very smallest and most unimportant details, and a description of one will therefore suffice for the two. It consists of three portions, a central one within which lies a chain attached at the handle of the device to a wheel. The instrument is straight until the last two inches are reached, where there is a marked curve, forming almost a semicircle. A screw is so arranged that from the outside one may tighten the chain, whereupon, instead of lying in the hollow of the curve of the instrument, as it does during introduction, it is raised up across the metal semicircle mentioned. Attached to this chain is an india-rubber sheathing. This is lifted by the chain and a septum is thus created.

When it is wished to utilize this instrument, it is passed in the manner of an ordinary sound, and after entering the bladder is withdrawn until the beak is felt to impinge tightly against the pubes. The chain is then tightened and the diaphragm is created. Moynihan states that various sizes of Cathelin's instruments are now made to fit the various-sized bladders which one is sure to encounter even in average-sized adults. The author admits that there is a difficulty in knowing that for a certainty the bladder has been tightly diaphragmed, but he expresses the belief

that a certain amount of tactile education and the use of these various-sized instruments will do away with this possible difficulty.

The opinion of such an extremely able operator as Moynihan must have very great practical weight. His conclusions therefore are quoted as follows: "My present opinion is in favor of the use of Luys's instrument for the female and of Cathelin's for the male, but I am prepared to admit that a more extended experience may modify my opinion. There can be no doubt that both instruments are of great practical value. I propose shortly to publish a complete series of observations, but meanwhile I may call attention to two cases reported by me in the *British Medical Journal*, April 30, 1904, in which great help was given by the separation of the urine."

J. Lynn Thomas (*British Medical Journal*, July 2, 1904), in speaking of the advantage of the Cathelin separator over other methods, particularly in reference to the discomfort caused, states that he left the instrument in a male patient's bladder for one hour and twenty-five minutes with very little discomfort. He says that since the publication of Bickersteth's article, in the *Lancet*, March, 1904, both the Luys and the Cathelin instruments have become well known and are receiving wide attention throughout England. He has found Cathelin's instrument to effect such a perfectly tight division of the bladder, that on introducing water, colored with potassium permanganate on one side, he was able to withdraw clear water, which had been introduced at the same time as the permanganate water from the other side. This showed that there had been absolutely no mixing. Similarly he found in another patient suffering from hematuria, that Cathelin's instrument drew highly colored bloody urine from the right side and clear urine containing albumin from the left. The first was alkaline, the second was acid. He believed at the time that the albumin on the left side might be due to a trace of the right-sided urine leaking past the diaphragm of the instrument. After operation, however, at which he removed a right-sided carcinomatous kidney, the urine became clear, but continued to contain albumin just as it did prior to operation. This shows that there had been no leaking.

At the recent meeting of the American Surgical Association in St. Louis, an instrument very similar to Cathelin's was exhibited. It had been devised two or three years ago by the member who showed it. He stated that he exhibited it simply for the purpose of showing that he had

been experimenting along these lines without success. The instrument in his opinion was in no way comparable to the Harris segregator and he advised the members that it was not practical to effect a division of the bladder into two halves with sufficient accuracy to be of clinical importance or use. This opinion was not disputed by any member present, the evident sense of the Association being that it concurred with the opinion expressed by the speaker.

Coming as they do so closely upon each other, these very diverse views on a very pertinent subject of extremely prominent British and American surgeons are interesting and instructive, but it looks at the present moment as though our transatlantic confrères have the best of this argument.

EPIDEMIC CEREBROSPINAL MENINGITIS.

DURING the last six or eight months New York City and many other places here in the East have suffered from an epidemic of cerebrospinal meningitis, and its lessons should not be allowed to pass unconsidered. The usual mortality from the disease is said to be something over 30 per cent. In the present epidemic at least this high death rate has been reached, and there are some who consider that nearly one in two of the patients who were victims of the genuine epidemic disease succumbed to it. It must not be forgotten, however, that usually in epidemics the disease is more fatal after it has existed for a time and has, as it were, acquired virulence by passing through series of susceptible individuals, and that the mortality has been known to go above 60 per cent. When the reports are all in, the experience may prove sadder than at first anticipated.

When epidemic there is every reason for taking what might seem extreme precautions against the spread of the disease. At the present time it is not known how the affection is communicated. Some reports of development of the disease after the occurrence of injuries of various kinds, especially those inflicted on the street, indicate that the disease may be contracted by contamination with street dirt, as is tetanus. The analogy with tetanus, pursued still further, would not make the limitation of the disease to the central nervous system so surprising. It seems not impossible, however, that in time contact with sufferers from the disease may give opportunity for the spread of the specific micro-organism. It has been often noted in Europe, and we believe also in this country, that the first case of the disease seen in a neighborhood occurred in a

tramp or wanderer. The study of this possible method of transferring the disease might throw great light on the methods of transmission.

The disease is usually said to be associated with filthy or uncleanly surroundings. The part the tramp is supposed to play in the matter of sporadic cases would seem to be in accord with this. There are, however, many cases of the disease reported among the well-to-do, where cleanliness is a constant habit. In the theory of the agency of street dirt in the causation of the disease, it must not, however, be forgotten that while unlike tetanus, the micro-organism seems to be present not constantly, but only at times of epidemics. At such times all wounds that have been contaminated with street dirt require more careful attention than before, even though they may not be severe.

While cerebrospinal meningitis is spoken of as an epidemic disease, and occurs in marked epidemic form about once every decade, it must be remembered that the affection is practically always existent, and that in Germany, where careful studies and analyses of statistics have been made in order to ascertain the course of frequency of the disease, it has been found that in different parts of the country some cases of the disease are always occurring. The same seems to be true here in the United States, for, as was pointed out by Dr. William Browning, in the *Brooklyn Medical Journal* for May, in an article on cerebrospinal meningitis in Brooklyn, some cases of the disease have been occurring at nearly all times during the last ten years. He considers that the germ is widely and continuously present in Brooklyn, and the possibility of an epidemic is always with us, should the unknown favoring conditions arise. In this regard it will be remembered that some three years ago six cases were reported on board the old receiving-ship Vermont, in July, 1901, and that it has been noted that in proportion to the population, according to Dr. Browning, the wards touching on the East River, Newtown Creek, or Gowanus Canal, that is, on the commercial waterways of the town, have about twice as many cases of the disease as the interior wards. Brooklyn is not an exception in this. Other cities with as carefully kept statistics show the same state of affairs.

At the May meeting of the New York branch of the New York State Medical Association, the discussion of epidemic cerebrospinal meningitis brought out many valuable opinions with regard to the differential diagnosis. As the ultimate

resort lumbar puncture must remain the most important diagnostic aid. If the first case or two that occurs in the district takes on the typical appearance indicated by that unfortunate name, spotted fever, and then gives signs of spinal meningitis, the diagnosis may be easy. As pointed out by Dr. Winters, however, cases may be extremely anomalous in type and may have a very insidiously deceptive appearance from that of mild tetanus to that of severe ptomain poisoning. Under such circumstances the diagnosis can be made only by autopsy, unless the *Diplococcus intracellularis* be found in the cerebrospinal fluid. In New York this micro-organism has been practically always found. There were some patients with true epidemic cerebrospinal meningitis in whom it was not found, but they were very rare.

As lumbar puncture, besides being of distinct diagnostic value, is also of great service in relieving the symptoms of coma and other manifestations due to high pressure within the spinal canal and the cerebral ventricles, there should be little hesitation in practising it. It is easy of accomplishment, it gives practically no pain, in a severe case the child is too comatose to notice it, and it represents the best possible means of affording relief. Its frequent repetition, whenever indications call for it, as when coma becomes deeper, is the only active remedial measure at present known for one of the most fatal of diseases. It has been practised many thousands of times without any bad results, and while it sometimes fails of its purpose, owing to anomalous conditions within the spinal canal, this constitutes no good reason for hesitating with regard to its employment.

Notwithstanding the high hopes raised by the favorable reports of the intraspinal injection of dilute solutions of antiseptics, especially from Portuguese observers, this method has not seemed to be of especial service in New York.

THE LONGEST EDITORIAL RECORD.

In speaking of Dr. Shrady's retirement from his editorial position with the *Medical Record*, in our last issue, we referred to his protracted relation with that periodical as "establishing for himself the longest editorial record in the country." In obedience to our invariable rule, we take this, the earliest opportunity, to correct our own error. Although Dr. Shrady's tenure of thirty-eight years was a long and honorable one, in point of duration it does not compare with that of the

elder Dr. Hays, as editor of the *American Journal of the Medical Sciences*, which continued uninterruptedly from its establishment in 1820 to his death in 1879.

Entering as he did an uncultivated field, there was trying work for Dr. Hays before the old world could be made to lend a respectful ear to medical progress in America, as recorded in the pages of his periodical, but he lived to receive universal recognition of the merit of his pioneer labors. That his editorial career fell at a later period detracts not a whit from the value of Dr. Shradys life work, for which the MEDICAL NEWS has no sentiment but that of respect and praise.

ECHOES AND NEWS.

NEW YORK.

Poisoned by Herb Decoction.—Two Italians are in Roosevelt Hospital suffering from belladonna poisoning. When taken to the hospital one was unconscious, the other so violent that it took several men to hold him down. The cause of the trouble is said to be a decoction made by one of the men, which both he and his workman drank as a remedy for a disordered stomach, and which was believed to be made of malva leaves. Malva leaves are said to be a regular home remedy of the Italians for stomach disorders. A few minutes after the men drank the decoction both became drowsy, but this state changed suddenly to great frenzy in the one while being conveyed to the hospital. A chemical analysis of the contents of the men's stomachs showed traces of belladonna.

Civil Service Examinations.—The State Civil Service Commission announces general examinations to be held September 10, 1904, including the following positions: Apothecary in State hospitals and institutions; architectural draughtsman; assistant steam engineer, Erie county service; bridge draughtsman; clerk; junior clerk; fireman; librarian, court of appeals library, Syracuse; physicians in State hospitals and institutions of both regular and homeopathic schools; trained nurse in State hospitals and institutions; woman officer in house of refuge and reformatories for women. Applications for these examinations must be made on or before September 3. Full particulars of the examinations and application blanks may be obtained by addressing the chief examiner of the commission at Albany.

Report of Contagious Diseases.—For the week ending Aug. 13, the Board of Health report is as follows:

	Cases.	Diseases.
Measles	95	8
Diphtheria and croup.....	211	23
Scarlet fever.....	50	2
Smallpox	1
Chickenpox	9	..
Tuberculosis	328	153
Typhoid fever.....	86	18
Cerebrospinal meningitis.....	..	24
Totals.....	779	229

Lying-in Hospital Appointments.—The following men have been appointed to the hospital staff: Drs. C. W. O'Connor, W. H. Sneider, E. K. Tanner, J. W. Edwards, to go on duty in September; Drs. H. I. Cauth, S.

W. Hamilton, A. R. Keith, to serve in October; Drs. R. M. Beach, W. S. Buckley, H. H. Armington, to serve in November; Drs. C. L. Boyd, C. W. Chapin, H. L. J. Dollard, to serve in December. Alternates, Drs. Shanley and McCollum.

PHILADELPHIA.

Philadelphia Hospital.—William F. Debrates, member of the Board of Education from the Thirty-ninth Ward, has been appointed superintendent of the Philadelphia Hospital to succeed the late Robert M. Smith.

Hospital Beds Endowed.—Requests of \$10,000 to the Presbyterian Hospital and \$5,000 to the Children's Hospital are contained in the will of Cornelia Thompson.

University Dental School Returns to Three-Year Course.—After maintaining for one year their four-year course in dentistry the University of Pennsylvania has been compelled to accede to the action of the National Association of Dental Faculties and reduce it to three years. The university opposed to the last this action, but was overruled. In an announcement to present and prospective students, Dean Kirk states that financial interests compel the change, but they regard the return as only temporary; the university believes that a four-years' course will ultimately be established upon a sound basis.

Medical Colleges Criticized.—The State Board of Medical Examiners announce that of the 379 candidates at the recent examination, 73 failed, a percentage of nearly 20. The usual failures are from 13 to 14 per cent. The fault is believed to lie in the curriculums of the colleges which instruct their students in the specialties to the exclusion of broad general principles. General illiteracy of the candidates is another reason for failures. Members of the board favor an investigation of teaching methods; this, however, would require legislative sanction.

First Report of the Department of Public Health and Charities.—The report of the Department of Public Health and Charities of Philadelphia from its organization in April, 1903, to the close of that year, shows very encouraging results. Director Martin thus summarizes the most important accomplishments of the year: (1) Securing the co-operation of the profession in the way of the special advisory board and the aid of representative medical societies of the city; (2) the appointment of 37 additional medical inspectors and two eminent diagnosticians, Drs. Welch and Schamberg, for the suppression of contagious diseases and the medical inspection of schools; (3) systematic courses of instruction for inspectors in the various bureaus; (4) the appointment and organization of an adequate corps of milk, meat and cattle inspectors; (5) the building of two portable steam chambers for disinfecting and cleansing infected houses; (6) appointment of a chief resident physician at the Municipal Hospital; (7) improvements at the Philadelphia Hospital, including tuberculosis pavilions and roof garden, installation of a modern record system, appointment of a salaried director of the clinical laboratory, and the naming of two eminent consulting surgeons, Drs. Brinton and White. The most pressing needs of the department at present is a hospital for the insane established on a suitable farm, remodeling of the Philadelphia Hospital on modern lines and the establishment of a plant for the manufacture of antitoxin and vaccine virus.

Report of the Bureau of Health for 1903.—The annual report of the Philadelphia Bureau of Health for 1903 shows a general death rate of 18.82 per thousand, 1.15 higher than the preceding year. Leaving out the deaths from accident, suicide and homicide, the rate would be

1792. During the year there were 3,043 cases of diphtheria, 4,188 of scarlet fever, 1,637 of smallpox and 8,701 of typhoid fever. All of these show an increase over 1902, varying from 295 in smallpox to 3,695 in typhoid fever. Regarding the occurrence of typhoid fever three facts are apparent: (1) Outbreaks are liable to occur at any season of the year; (2) certain wards are most affected; (3) an unusual number of cases may suddenly appear in isolated localities. The conclusion is that outbreaks are due to widespread and continuous contamination of the water supply. Occasional local outbreaks are due to other causes, and for these the milk supply is principally blamed. Special efforts are being made to locate such milks. Statistics show that the Municipal Hospital, in which are confined smallpox cases, must still be considered a focus for the dissemination of that disease. Although all precautions are taken, no permanent improvement is looked for until removal of the hospital to a new site.

Disinfection of Houses.—Experiments and bacteriological investigations have shown that the most efficient method for use in routine house disinfection is the direct application by means of an atomizer of formaldehyde in solution to all the surfaces of the rooms. The solution used is 5 parts of the 40 per cent. solution of formaldehyde to 95 parts of water, approximately a 2 per cent. solution of formaldehyde gas in water. A machine devised in the laboratory throws a finely divided stream a distance of eight feet. For each 1,000 cubic feet an amount of the solution equal to a pint of the 40 per cent. formaldehyde is used. Tests show 100 per cent. of surface disinfection and more than 85 per cent. of test objects containing various bacteria. Because of the possible presence of protozoa in the houses occupied by smallpox patients, the above process was for a time supplemented by the burning of sulphur. This was finally abandoned because of the lack of means for readily determining its efficiency, and also because of its destructive effect upon certain articles of furniture when wet from the spraying.

Widal Reaction in the Diagnosis of Typhoid Fever.—During 1903 this test was made a greater number of times than in any preceding year, many specimens coming from Butler. Out of 6,341 samples, representing 5,508 patients, there was a discrepancy between the laboratory and clinical diagnosis in 6.94 per cent. Since 1897, 28,862 examinations of samples from 24,588 cases have been made. Among them there was a discrepancy of 4.9 per cent.

CHICAGO.

Incorporation of Swedish Hospital.—Articles of incorporation were issued July 20 for the Washington Park Hospital, to be built near Washington Park. The institution has a capital stock of \$50,000, and has at present accommodation for thirty patients in a building at Sixtieth street and Vincennes Avenue.

Hospital Benefits by Lawn Fête.—The lawn fête given by the St. Francis Hospital Association at Evans-ton last week netted \$1,400 to the funds of the hospital.

Week's Deaths.—Acute intestinal diseases caused 120 of the 473 deaths for the week ended August 6; consumption, 58; violence, 44; heart diseases, 34; Bright's disease, 33, and pneumonia, 27. The annual death rate per 1,000 was 12.78, which compares very favorably with 14.29, the rate for the corresponding week last year.

Typhoid Threatens Strikers and Strike-Breakers.—Typhoid fever, which threatens to become epidemic among the strikers' families in the district west of the stock yards, is feared in the ranks of strike breakers. A non-union workman at the Armour plant has been

removed from his home to a hospital suffering from the disorder. A man and a woman employed as strike breakers at the Swift plant were removed to hospitals suffering from ailments supposed to be typhoid fever.

Smallpox in Dowie's Land.—The citizens of Waukegan, Wis., are still uneasy concerning the reported epidemic of smallpox at Zion City, Ill., and are awaiting the investigation by the inspector, Dr. E. F. Baker, of East St. Louis, sent there by the State Board of Health. Dr. Herman Spalding, of the Chicago Health Department, a deputy State health inspector, visited Zion City and examined the cases there. He found sixteen cases of smallpox, but pronounced them a mild form of the disease. None of the patients has been vaccinated, however, as vaccination is not permitted in Zion City. Dr. Spalding protested against this. The sixteen patients were all quarantined at an isolation hospital, a frame structure two miles from Zion City on the lake shore. The hospital is well guarded. The houses from which the cases were taken are also quarantined and under guard.

GENERAL.

Dr. Osler Going to Oxford.—King Edward has approved the appointment of Dr. William Osler, of Baltimore, as Regius Professor of Medicine at Oxford University, in succession to Sir John Burdon Sanderson.

Dr. Osler is physician in chief of the Johns Hopkins Hospital and Professor of Principles and Practice of Medicine, to which positions he was appointed in 1888. His contributions to medical science have been many and valuable, and have made him well known as a physician, pathologist and physiologist throughout the medical world. He was born in Canada and received his education at Trinity College School and Trinity College in Toronto. He studied medicine at McGill University, Montreal, and at the Toronto School of Medicine, where the degree of Doctor of Medicine was conferred on him. He further pursued his studies in Berlin, Vienna and at the University College, London. The faculty of McGill University elected him to the chair of the institutions of medicine in October, 1874. He was elected pathologist to the Montreal General Hospital in 1875, and three years later was appointed physician and lecturer on clinical medicine in the summer session.

Dr. Osler was unanimously elected by the University of Pennsylvania to the chair of clinical medicine in 1884. He remained there a year, and in 1885 was appointed Gladstonian lecturer in the Royal College of Physicians and Surgeons, London. A short while afterward he was appointed Cartwright lecturer in the College of Physicians and Surgeons, New York. He is a Fellow of the Royal College of Physicians, London. The University of Aberdeen, Scotland, and several American universities have conferred upon him the degree of LL.D.

We are glad to be assured that Dr. Osler does not intend to sever his present relations with the Johns Hopkins University until June, 1905, or after the completion of the approaching session.

Cholera in Russia.—A dispatch from St. Petersburg states that the sanitary authorities and the police are co-operating to suppress an outbreak of Asiatic cholera in that city. There have not been many deaths, and the number is not stated officially.

Study of Mosquitoes in Montana.—The sixth session of the University of Montana biological station at Big Fork, on Flathead Lake, in that State, is engaged in investigating the mosquito. The work is especially difficult owing to their disappearance from the swamps in which they had been found unbearable in other years.

By diligent search of the pools, puddles and swampy places adjacent to the laboratory a considerable quantity of material, both in the larval and adult state, has been secured, and breeding experiments are being carried on in the laboratory. Seven distinct species have thus far been found as a result of two weeks' study. *Anopheles maculipennis* is very rarely found. This is the species that is known to carry malaria. No malaria has ever been known to have occurred in the region. The absence of mosquitoes is due almost entirely, if not entirely, to the absence of rainfall this spring. The mosquito crop comes largely from small and temporary pools and puddles, where other forms of insects do not have time to mature. The mosquito has a shorter period of life in water than most insects, shorter than that of any of its enemies, and can live where few other forms of life will exist. Clearing the region of underbrush so the sun may dry up the puddles, draining the swamps and burning debris has done much to reduce the number of mosquitoes and abate the nuisance.

Fourth Pan-American Medical Congress.—The meeting of this congress, which was to have convened the latter part of December of this year at Panama, has been postponed until the first week in January. This was done at the request of many physicians who proposed to attend it, as they desired to be at home with their families during the Christmas holidays. The delegates from this side of the continent will therefore leave on Tuesday, December 27, if they go down from New York by the regular Pacific Mail Lines, or at other dates if they go by way of New Orleans or Jamaica. The congress will be held from the 4th to the 7th of January. The dates of sailing from the Pacific Coast have not yet been ascertained. The officers of the congress appointed by President Amador, of the Republic of Panama, are: Dr. Julio Icaza, Dr. Ciro Uriola, Dr. J. Calve, Dr. Carlos Cooks, Panamanians; Dr. Gorgas, chief of the Panama Canal Sanitary Commission, Drs. Carter and Ross, Americans; Dr. Manuel Corales, Cuban; Dr. M. Stern, English, and Dr. Oduber, Dutch. This bids fair to be the most successful Pan-American medical congress that has ever been held, on account of the central situation of Panama and its easy approach from both sides of North America, Mexico, Central American Republics, as well as from the countries on the north and west sides of South America. There will be but four sections at this congress—surgery, medicine, hygiene and the specialties.

Research Work in Government Laboratories.—The recently erected laboratory of the Public Health and Marine Hospital Service is doing some very good work along experimental lines. The zoological division has been investigating the hook worm, besides doing much general work. Anything in the shape of worm or animal life affecting the human body can be sent there for determination. While specimens from private physicians have thus far been examined without charge, the laboratory will take pains not to compete with men who are conducting similar work on private account. All the drugs used in the Public Health and Marine Hospital Service, which has 60,000 patients a year, are examined in the pharmacological division. This branch of the laboratory is also on the lookout for new alkaloidal principles in drugs, and is constantly studying the effects of new drugs upon animals. This is chiefly research work. Of late some of the most important experiments have been made with quinine compounds, and although the results are not quite ready for presentation, the prospect is that some important discoveries may be announced. The aim was to secure a compound which would kill the malarial parasite that quinine is so ef-

fective in attacking, but one which would be without the ordinary disagreeable effects of that drug. Experiments have gone far enough to show a quinine derivative which is a great deal more effective on these micro-organisms, but not so injurious to warm-blooded animals. The tests have not yet been applied to human beings, but the poisonous qualities of the compound have been pretty well ascertained. It takes twice as much of the new quinine to kill a mouse as of ordinary quinine, while it is known to be more effective against the malarial organism. The findings along this and similar lines are published in the laboratory bulletins, which are issued from time to time.

The American Medical Society for the Study of Alcohol and Other Narcotics.—This association was organized June 8, 1904, by the union of the American Association for the Study of Inebriety and the Medical Temperance Association. Both of these societies are composed of physicians interested in the study and treatment of inebriety and the physiological nature and action of alcohol and narcotics in health and disease. The first society was organized in 1870 and has published five volumes of transactions and twenty-seven yearly volumes of the *Quarterly Journal of Inebriety*, the organ of its association. The second society began in 1891 and has issued three volumes of transactions and for seven years published a *Quarterly Bulletin* containing the papers read at its meetings. The special object of the union of the two societies is to create greater interest among physicians to study one of the greatest evils of modern times. Its plan of work is to encourage and promote more exact scientific studies of the nature and effects of alcohol in health and disease, particularly of its etiological, physiological and therapeutic relations. Second, to secure more accurate investigations of the diseases associated or following from the use of alcohol and narcotics. Third, to correct the present empirical treatment of these diseases by secret drugs and so-called specifics and to secure legislation, prohibiting the sale of nostrums claiming to be absolute cures containing dangerous poisons. Fourth, to encourage special legislation for the care, control and medical treatment of spirit and drug-takers. The alcoholic problem and the diseases which center and spring from it are becoming more prominent and its medical and hygienic importance have assumed such proportions that physicians everywhere are called on for advice and counsel. Public sentiment is turning to medical men for authoritative facts and conclusions to enable them to realize the causes, means of prevention and cure of this evil. This new society comes to meet this want by enlisting medical men as members and stimulating new studies and researches from a broader and more scientific point of view. As a medical and hygienic topic the alcoholic problem has an intense personal interest, not only to every physician, but to the public generally in every town and city in the country. This interest demands concentrated efforts through the medium of a society to clear away the present confusion, educate public sentiment, and make medical men the final authority in the consideration of the remedial measures for cure and prevention.

OBITUARY.

DR. LINDHURST C. DODGE, of Rouses Point, N. Y., died suddenly at his home on the night of August 13. He was sixty-three years old.

DR. A. W. WARREN, of Union Hill, N. J., died August 13, in the Presbyterian Hospital, from blood poisoning, contracted three weeks ago while performing a surgical

operation. He was advised to have the arm amputated, but would not consent to it, being confident of recovery. Dr. Warden was prominent in local affairs of Union Hill, having served in the Board of Education and having been the organizer of the first public library in the town. He was forty-seven years old.

Dr. JOSEPH WIENER, active in many philanthropic and scientific movements, died at his residence, 1046 Fifth avenue, August 14, of heart disease, after an illness of several months. He was born in Hauska, Bohemia, April 5, 1828, and came to this city in 1849. For thirty-five years he was actively engaged in the practice of medicine here, during a large part of this time as an associate of the late Dr. William Detmold in the chair of military surgery at the College of Physicians and Surgeons. He was also one of the founders of the department of pathology of that institution prior to its incorporation as a part of Columbia University. Dr. Wiener retired from practice more than twenty years ago. Throughout his entire life Dr. Wiener was an enthusiastic lover and collector of objects of art, and was a member and patron of the Metropolitan Museum of Art and of the Museum of Natural History. He was also a member of the Geographical Society, the Academy of Sciences, the Numismatic Society, the Symphony Society, the Oratorio Society, and various other scientific and literary organizations. He was one of the founders of the Palette Art Club. In 1885 he presented the statue of Washington Irving, which now stands in Bryant Park, to the city. He was also one of the organizers and first vice president of the Union Square Bank. During the Civil War he was chairman of the Republican organization in his district.

Dr. HENRY B. MCCARROLL died suddenly last Wednesday at his parents' home in Morristown, N. J., from pneumonia. He was born October 7, 1856, and was a member of the Yale class of '78 and was graduated from the College of Physicians and Surgeons of New York City in 1881. He spent two years in hospital work and then became an instructor of medicine in the Post-Graduate Hospital.

CORRESPONDENCE

OUR PARIS LETTER.

THE WATER QUESTION—PURIFICATION AND EPANDAGE—
DRINKABLE WATER AND SEWER WATER—BIOLOGICAL PROC-
ESS—ACTION OF MICROBES—FAILURE OF EPANDAGE.

PARIS, FRANCE, August 6.

IDEAS are like certain plants, some bloom out and fructify very quickly; others, on the contrary, take centuries to pierce and arrive to maturity. Such, for example, is the water question, which has interested man ever since drinking water has been heard of, but presents a new phase and added attraction during the last ten years on account of the necessity of epuration. Naturally men have always preferred pure, fresh, limpid water. The Romans, who were masters in the art of construction, at great expense brought drinkable waters into their cities by means of superb aqueducts, the remains of which are still admirable.

The idea has prospered since then, and the first care of every town council is to bring in good water for the inhabitants. Paris has expended more than \$30,000,000 to bring in the waters of the four smaller rivers, which supply about 320,000 cubic meters of water a day besides the filtering reservoirs established for the Seine water. Our ancestors gave little attention to the cleansing of their towns. The rivers, as the Tiber of old, and

as the Ganges to-day, played the part of sewers, carrying along all the filth of the towns and thus becoming transformed into a permanent source of danger to public health. In the nineteenth century the grand industrial and manufacturing outburst by the multiplication of factories everywhere added a new element, causing increased silting of the rivers and contamination of their waters. This time the evil brought its own remedy. Until then man's health alone had suffered from the contamination of rivers. Now, as these received the waste and refuse of factories, certain new substances were introduced which rendered the springs and rivers unfit even for fish life. It is no longer clear and limpid water that flows among the meadows, but a black and pestilential liquid, a source of infection and epidemic.

Dr. Calmette, Director of the Pasteur Institute at Lille, taking his example from trials made in England and Germany, has introduced into France the biological purification of residuary water. By this is meant the complete destruction of putrescible organic matters characterized by clarification and their mineralization, and not simply a mechanical separation. Microbes or fire are the only agents capable of effecting this destruction.

In the epandage or refaction of water the cultivated soil transforms all the filth that is poured upon its surface into gaseous elements which escape into the atmosphere. But this is only possible with deep, porous, well-drained soils. In the experimental fields at Achères, near Paris, one hectare (2.47 acres) of one meter's depth can absorb 110 cubic meters of sewage water a day. A town of 100,000 inhabitants, reckoning 100 liters of water per day for each inhabitant, would require a surface of epandage equal to 91 hectares for 3,650,000 cubic meters per annum. At this rate this system is only possible for large towns with vast sandy or calcareous fields in their neighborhood, which must at the same time be very absorbent and of little value.

The hygienic results of experiments made at Gennevilliers, Achères, and especially at Carrieres-Triel, have been far from satisfactory. It was an error to reckon on the purifying powers of cultivated soil. Plants are only able to absorb organic matters when these are in a state of soluble nitrates. Moreover, the accumulation of organic matter favors the development of mosquitoes and flies, which are the vehicles of numerous infectious diseases. For the last ten years Percy Frankland, Gilbert Fowler, Sir H. Roscoe, in England, Hiram Mills and Kennicut, in America, have drawn the attention of sanitary engineers to this question. The system of biological epuration is employed with success in twenty-two towns in England. Manchester purifies in this way 180,000 cubic meters of sewer water a day. Formerly this town employed the system of chemical precipitation, which produced an enormous quantity of mud, which had to be carried to the sea in boats. This method of epuration, modified by Dr. Calmette, who has found the perfect solution of the difficulty consists of three distinct operations; a decanting and separation of the non-putrescible solid residues; a dissolution of organic matters in a septic covered tank under the influence of anaerobic microbes; and, lastly, a transformation of the organic matter into nitrates by their oxidation on bacterial beds, or species of epandages formed of scoræ of metallic dross; this oxidation being performed by anaerobic microbes.

The sewer water, after a sojourn of twenty-four hours in the septic tank, and after a passage over two bacterial beds, in each of which it remains two hours, comes out perfectly pure and limpid. These bacterial beds, formed of a layer of scoræ one meter thick, can serve three times in twenty-four hours. Each period of eight

hours is thus divided; one hour for filling, two hours full, one hour for emptying. Four hours are necessary for airing the bed.

By the study of the different methods of epuration now employed we can see, from the experiments of Dr. Calmette, successfully carried out at the village La Madeleine, near Lille, that biological epuration alone gives good results. By this process 5,000 cubic meters of residuary water per hectare can be purified in a day; that is to say, a volume of polluted water at least forty-five times greater than by epandage or refection, which only purifies 110 cubic meters per hectare.

Other experiments have been made at Say's sugar refinery of Pont d'Ardres, under the supervision of Mr. Cronier. These diverse results prove the failure of epandage, as actually practised, and foreshadow the substitution of the biological system. The cleansing of manufacturing districts and towns will thus make large strides, and hygiene will have registered another victory.

SOCIETY PROCEEDINGS.

NEW YORK STATE MEDICAL ASSOCIATION— NEW YORK COUNTY BRANCH.

Regular Monthly Meeting held May 16, 1904.

The President, Alexander Lambert, M.D., in the Chair.

Appendiceal Enteroliths.—Dr. Frederick Holme Wiggin presented the specimens of an appendix recently removed in which there were a number of concretions. The symptoms of the case had been those of a mild appendicitis. There was no perforation found, but in the neighborhood of the largest stone, there was a dangerous thinness of the wall of the appendix, and pressure had produced an area of inflammation through which rupture with consequent peritonitis would also inevitably have taken place in a short time. It is evident, of course, that these stones have taken a long time, very probably many years to form, and yet there had never been any previous symptoms of appendicitis, and nothing pointing to the existence of a serious pathological condition in the right iliac fossa.

In discussing the specimens Dr. Alexander Lambert said that the occurrence of enteroliths in the appendix were by no means uncommon, and that undoubtedly their presence frequently was the basis of the tendency to appendicitis, whenever a condition of lowered resistive vitality asserts itself, or some especially infectious material finds a lodgement in the neighborhood.

SYMPOSIUM ON CEREBROSPINAL MENINGITIS.

The principal part of the scientific business of the evening consisted of a series of papers on epidemic cerebrospinal meningitis, with special reference to the epidemic at present under special observation in many cities of this country, and the early differential diagnosis of this disease and its treatment.

Lumbar Puncture.—Dr. Thomas Wood Hastings said that since the introduction of spinal puncture much that is definite has been learned of the bacteriopathology of various forms of spinal meningitis. This puncture is usually performed by inserting a needle between the third and fourth lumbar vertebrae, the fourth being usually the best for this purpose, because the dura is adherent to the bodies of the vertebrae in this region and is not pushed before the needle. The method employed is either that of Quincke with the patient in the lateral position, or that of Führinger with the patient in the sitting position. Those who have had most experience with lumbar puncture apparently prefer the

sitting position, but it is still an open question and a matter of habit rather than choice.

Therapeutics of Lumbar Puncture.—Lumbar puncture has, however, besides its diagnostic value, a definite therapeutic value. It may bring about a reduction of the pressure of the cerebrospinal fluid and thus relieve many of the patient's symptoms, especially those relating to comatose conditions. Usually, where there is high pressure in the spinal canal in adults, at least 50 or 60 c.c. are removed, though as high as 100 c.c. may sometimes be allowed to flow out to advantage. For diagnostic purposes in acute cases five c.c. of cerebrospinal fluid are sufficient. In recent years an improvement on simple lumbar puncture has been the subsequent injection of a certain amount of normal salt solution, with the idea of diluting the toxins present and perhaps even tempting some of those already in spinal cells into solution in the cerebrospinal fluid where they will be less actively harmful. Attempts have even been made to introduce other drugs, lysol and certain milder antiseptics.

Differential Diagnosis.—Whenever the cerebrospinal fluid is cloudy infection is surely present unless the cloudiness is due to hemorrhage; even when the cerebrospinal fluid is clear, if there are fibrinous threads in it, or, if after it has stood for a time, there is a tendency to coagulate into fibrous flakes, an infectious process is at work within the spinal canal. In the examination of cerebrospinal fluid for a diagnostic purpose, it is in this fibrinous material that bacteria and pathological cells are to be looked for. In tuberculous meningitis there is practically always an excess of mononuclear leucocytes. At the beginning of epidemic cerebrospinal meningitis there is always a polynucleosis, that is, a decided increase in the number of polynuclear leucocytes. Later on mononucleosis may develop.

Variety of Micro-organisms.—Nearly all forms of micro-organisms have been found in the cerebrospinal fluid. Even when the affection is of one type there may be a mixed infection of other bacteria besides those specific for the disease. At times there is a spinal meningitis, without any micro-organism, sometimes spoken of as a simple serous meningitis, because no bacteria can be found and there is a very slight tendency to fibrin formation. These cases are sometimes otogenic, that is, due to some infection from pathological process not very virulent in character near the ear. Diplococci are very common in affections of the spinal meninges. Some of them look not unlike gonococci. Gonococci, however, are rather rare. The *Micrococcus catarrhalis* occurs not infrequently. The *Diplococcus intracellularis* of Weichselbaum is thought to be the cause of epidemic cerebrospinal meningitis, and is being seen rather frequently at the present time in cerebrospinal fluid. The differential characteristics between this last organism and the *Micrococcus catarrhalis* are that the micrococcus grows on all media, and on solid media presents a rather tough growth and is quite a long-lived micro-organism. The *Diplococcus intracellularis*, on the other hand, does not grow except under rather favorable circumstances; for instance, the temperature must always be above 20° C. Its growth is of jelly-like consistency on hard media and it is a rather short-lived micro-organism.

Peculiar Disease.—Dr. Joseph E. Winters said that it is hard to speak of the cerebrospinal meningitis epidemic under any one type of disease, since it presents so many anomalies in its course. It may bring the life of a robust, sturdy child to an end in two short hours. It may leave life hovering in impenetrable incertitude

for weeks without hope and without the doctor being able to say anything definite as to the prognosis. Then, suddenly, there may be a beginning of recovery and unconsciousness may depart and complete convalescence ensue, in the midst of which, however, relapse may take place and in a few hours a fatal termination disappoint all hopes. A disease that runs as anomalous a course as thus described can scarcely be brought under a few symptomatic headings. General remarks then are likely to be more suggestive and valuable than formal classifications of symptoms and course. The disease often beggars description and one almost feels as if one were the subject of a bad dream, rather than engaged in the sober consideration of disease.

Illustrative Cases.—A patient seen recently, a child about five years of age, fell on a Saturday evening and hurt its forehead. It awoke early in the morning and asked for a drink. The father noticed that it swallowed peculiarly. A physician was summoned, but the history that the child had suffered from laryngismus stridulus some ten or twelve months before, seemed to account for this symptom. The child did not get better and after two days developed trismus. The diagnosis made then was tetanus. The port of entry for the micro-organism was considered to be the injury. The temperature stayed at about 102.5° F. When Dr. Winters was called to see the case the physician was considering the idea of administering tetanus antitoxin, but Dr. Winters hesitated because of the marked involvement of the sensorium. Further study of the case showed that this was the most prominent symptom and that with the exception of the trismus there was no tendency to spasm. The disease was pronounced to be cerebrospinal meningitis, because of the epidemic now raging, and when the little patient died next day the autopsy served to show the correctness of the diagnosis. Before the death, the temperature had risen to 107° F. The length of the disease from the first symptom to the fatal termination was only five days.

Traumatic Infection.—In another patient there was a history of attempts to remove a foreign body from the ear which led to its being pushed through the tympanum. An aurist was consulted who made an incision behind the ear in order to pull the ear forward and by so doing succeeded in removing a pea from behind the remnants of the drum membrane. Eight days later, while eating strawberries and cream, the patient was taken with vomiting and abdominal pain. The temperature rose to 106° F. When Dr. Winters saw the case the most marked symptom was severe tremulousness of both hands, though there was no tremor in the legs. An examination of the spine showed no tenderness in the lower part, but distinct tenderness in the lower dorsal region and extreme tenderness higher up. It is important in these cases to learn to appreciate the reaction of the patient to pain by beginning the examination at a point where no tenderness is expected. When the child was lifted into a sitting posture there was a marked attack of vertigo, which is always a prominent sign, and the disease was set down as cerebrospinal meningitis. In another case, a large healthy girl ate a good breakfast; shortly afterward she was taken with headache and vomiting and in six hours and fifteen minutes from the first symptom was dead.

Pseudo-Appendicitis.—One little patient recently fell ill while on a visit to its grandmother and, of course, the symptoms were attributed to some overindulgence in food, because of grandmother's lax care in the matter. The little one complained of pain first in the left side of the abdomen, but later this pain seemed to become localized in the right side and the affection was

considered to be appendicitis. When Dr. Winters was called in consultation there was an ice-bag over the left iliac region and the patient was better. The improvement continued for some time. Then uncontrollable vomiting set in, which was finally brought under the influence of morphine. For several days no food could be taken of any kind, and peptonized milk was given by the rectum. All tenderness left the abdomen after a time and it became very clear that the seat of the symptoms was the nervous system. In the light of knowledge of the present epidemic the affection was finally diagnosed as cerebrospinal meningitis and other confirmatory symptoms were found.

Suspected Poisoning.—In the case of four girls who fell ill at a school along the Hudson, their illness was ascribed to poisoning. The symptoms were very severe and began with vomiting and headache in all of the cases. The only thing that all of them had taken was some Rochelle salts. These were sent to Philadelphia for analysis. Two of the patients died. When called in consultation Dr. Winters was inclined to agree in the diagnosis of poisoning until he noted that the pupil of one of the patients suddenly dilated and then as suddenly contracted. This aroused his suspicion of cerebrospinal meningitis and at the autopsies, for all four of the little patients died, this diagnosis was confirmed.

Symptomatic Course.—As a rule the symptoms of cerebrospinal meningitis epidemica develop very suddenly and not with the slow gradual progress of tuberculous meningitis. The pulse is likely to be exceedingly rapid, while that of tuberculous meningitis is slow and irregular. There is a tremor present in practically every case. Usually there is some stiffness of the neck and also of the muscles of the trunk, but even when this is not present any sudden change of position is sure to be painful, unless the patient is in coma, and to lift the patient's head up always causes extreme vertigo, even in cases that are not severe. Changes of position are followed at once by great increase in the pulse and by tremor. The patient is usually afraid of being moved and skin tenderness to a marked degree is one of the most common features of the disease.

Prognosis.—When the affection has a sudden violent onset the outlook is very unfavorable. Great depression expressed by an extremely sunken countenance also has a bad prognosis. A high temperature or a very rapid pulse early in the case is likely to show a fatal termination. Mottling of the skin is another bad sign and complete involvement of the sensorium is also unfavorable. It must not be forgotten, however, that profound coma may exist for weeks and yet the patient recover completely. Nothing can be said in the meantime, for the patient may never rouse out of the coma, and yet the least favorable symptom may be the beginning of a reasonably rapid convalescence. Sudden contraction and dilatation of the pupils in these cases is likely to portend a fatal termination.

Treatment.—The abstraction of blood by means of leeches applied to the nape of the neck along the spine and to the temples is always followed by relief of symptoms. An ice-cap should always be employed as well as spinal ice-bags; this should not be considered merely expectant treatment, but, besides giving relief to the patient, it shortens the course of the disease, seems to lessen the inflammation and is thus directly curative. One of the most important drugs in this disease is opium. It should be given freely and the patient should be made, as far as possible, free from pain. This point cannot be insisted on too much. The pain itself will help to make the affection fatal, if allowed to persist. After opium the most important drug is the fluid

extract of ergot, which should be given in rather large doses from the beginning to the end of the disease. The most interesting thing about the disease, in Dr. Winter's opinion, is the uniformity of the lesions found at autopsy, and yet the multiplicity of symptoms with the very variously differing onset and course which the affection follows.

Dr. Lee, in opening the discussion, said that the medicolegal aspect of these cases is interesting, since the question of their following injury to the head or to other parts of the body may bring up the question as to responsibility for the fatal termination of the illness that follows what would ordinarily be a rather mild traumatism.

Symptomatic Course.—Dr. Morris Manges said that it must be borne in mind that adults are quite as likely to suffer from cerebrospinal meningitis as children, and that, as a matter of fact, in the present epidemic in New York, a large number of adults have had the disease in severe form and many have died from it. In his experience with these patients at the Mt. Sinai Hospital certain characteristic symptoms have always been noted. Herpes has occurred in every case. Usually it was at the angle of the mouth, but sometimes below the chin, and occurred either early or late in the disease. In severe forms roseola or petechiae were often seen, and a form of rash that is very interesting and which was described by certain Portuguese observers who have studied a number of cases of the disease recently, is seen with great uniformity about the knees, the trochanters and the elbows. It may be described as a goose-skin appearance, but with the projecting papillae reddened and irritated-looking, almost as if they had been stripped of their epidermal covering. A deep vermilion color is quite characteristic of some of the lesions of the disease. In mild cases this form of eruption may be helpful in the differentiation of cerebrospinal meningitis.

Eye Symptoms.—Variability of the pupils is an exceedingly valuable sign. A difference in the size is often noted first, and then sudden changes from extreme dilatation to extreme contraction, the pupils not acting synchronously, are often noticed. A deeply congested eye was one of the most uniform external features of the disease at Mt. Sinai Hospital. Strabismus is seldom lacking at some time or other in the disease, and when the patients are conscious double vision may be complained of early. Echymoses are seen at times and especially whenever there is a tendency to petechial eruptions elsewhere.

Headache.—One of the very common symptoms is headache, which may mark the beginning of the disease, and is sure to be seriously complained of whenever the patient does not lapse into coma. There is a marked tendency for patients who are not comatose to curl up and flex themselves as much as possible. This gives a series of patients a characteristic look by which the affection is hinted at at once. They are very sensitive to motion and are likely to resent any change of posture.

Differential Diagnosis of Coma.—Where patients go into coma without much warning, as is sometimes the case, it is not always easy to be sure that the affection is not uremic coma. These severe cases are often hemorrhagic, and if hemorrhages occur in the kidneys this may give rise to the thought of hemorrhagic nephritis from the appearance of the urine and so add to the difficulty of the diagnosis. Where sugar occurs in the urine in sudden cases the likeness to diabetic coma becomes very marked. The pressure upon the floor of the fourth ventricle by the rise in pressure of the cere-

brospinal fluid may cause, at least temporarily, glycosuria. So during an epidemic this fact must be borne in mind. The differentiation must be made by the pupillary signs and by certain nervous symptoms such as Kernig's and the Babinski phenomena.

Corroboration of Symptoms.—Nervous symptoms are more apt to be present in adults than in children, and lumbar puncture with its high leucocyte exhibit is of great service. The presence of a high leucocytosis in the circulating blood is also important. In a word, the main advance in differential diagnosis has taken place by corroboration of symptoms rather than by the finding of any pathognomonic symptom or set of symptoms. The sudden onset of the disease and its rapidly fatal termination sometimes makes diagnosis impossible. A woman brought into the hospital in coma, the only previous history being the occurrence of vomiting and the gradual sinking into a comatose condition, died within two hours of admission. On the other hand, mild forms of the disease may occur, and during the present epidemic the occurrence of depression with fever from no known cause accompanied by injection of the eyes and absence of the patellar reflexes, must give rise to suspicion.

Lumbar Puncture in Diagnosis.—Where there is grave doubt as to the nature of the disease, lumbar puncture is extremely important. Ten drops of cerebrospinal fluid will give the opportunity for finding the *Meningococcus intracellularis*, and this at once settles the diagnosis. Very few cases have been observed in the present epidemic, in which the meningococcus could not be readily demonstrated. Lumbar puncture is, however, is also curative as well as of diagnostic aid. It is not done often enough. The sudden deaths that are reported in many cases of epidemic cerebrospinal meningitis would not occur with nearly such frequency if timely lumbar puncture were done and the procedure repeated as often as symptoms of coma asserted themselves. It must not be forgotten that the cerebrospinal fluid is apt to accumulate very rapidly. The introduction of certain drugs into the spinal cord sometimes seems to prevent this. One of the most promising of these is lysol. It has been used in Portugal with good results, and seems to have given some satisfaction in the present epidemic. Hot baths are very good in the treatment of cerebrospinal meningitis, and should be given as directed by Aufrecht, at a temperature of about 104° F., with massage, somewhat as in typhoid fever. Patients should not, however, be given cold baths. The skin surface is entirely too sensitive. Baths should not be given either at the beginning of the affection, when the patient is irritable and has a great disinclination to be moved about. As for drug treatment, the most satisfactory remedy is undoubtedly opium, which has an excellent effect and should always be used to save the patients the otherwise intolerable pain of which they complain.

Characteristic Symptoms.—Dr. Leszynsky said that certain symptoms should give rise to suspicion of the possible existence of cerebrospinal meningitis, now that the epidemic is on. Changes in the pupils are the most important, and after these the loss of the knee-jerks. The fever is apt to run very high, and 103° F. is rather low in severe cases of cerebrospinal meningitis. Dr. Leszynsky has employed lysol injections in one case into the spinal canal, removing ten c.c. of fluid and injecting the same amount of one per cent. solution of lysol. The patient suffered from collapse several hours later, but all the symptoms subsided and improvement set in, until convalescence was established. This treatment should not be used in milder cases.

Dr. Palmer Dudley said that lumbar puncture is by no means an easy procedure in the child, though it may be performed without difficulty in older people. It must not be forgotten that in aged people it is quite the rule not to be able to obtain any cerebrospinal fluid on ordinary puncture. There is very little danger from the procedure, however, as Dr. Dudley has employed it in a number of cases for spinal anesthesia.

Spread of the Disease.—Dr. James J. Walsh said that the most interesting problem at the present moment is how cerebrospinal meningitis is spread. We are undoubtedly in the midst of an epidemic of the disease, and any hints in this matter may prove very valuable. In Europe it has often been noticed that sporadic cases of cerebrospinal meningitis occur in tramps or in connection with people who have been living in great uncleanness, and have moved from one part of the country or city to another. After the disease has thus been introduced into a town, it is not unusual to have several other cases occur in the neighborhood. It would be interesting to know if that special product of our modern civilization, the tramp, had anything to do with the spread of the epidemic in America. It would seem as though uncleanness cannot be considered to have as much to do with the origin of the disease, as has been thought, since a number of the cases in the present epidemic have occurred among classes of people who are very careful of cleanliness.

Prognosis after Severe Complications.—Dr. Walsh said that too unfavorable a prognosis in severe cases is not always justified. In one case, where coma lasted for several weeks and where, after the disease, the patient was not able to walk well for several years and had a distinct difficulty in speech, all the symptoms disappeared during the course of ten years and practically a complete recovery took place. Only one sign of the disease was left, a slight weakness of the anterior tibial muscles.

Dr. Francis Huber said that cerebrospinal meningitis is an extremely variable disease and hard to diagnose. Lumbar puncture should be performed in doubtful cases, and even in small children from eight to ten c.c. of cerebrospinal fluid should be removed. Less than this had no favorable influence. In one severe case under his observation lumbar puncture was performed fifteen or sixteen times, though before its performance the patient was sometimes so violent as to need restraint. He was now improving. The operation is easy in children.

Dr. Delphay considers that the cerebrospinal meningitis is more atypical in adults even than in children. There may be convulsion, followed by delirium without retraction of the head, without stiffness of the neck and without herpes, with a temperature very little above 100° F. and pulse below 100. In such a case the diagnosis is impossible without lumbar puncture.

Septicemic Cerebrospinal Meningitis.—Dr. Maas said that during the existence of the epidemic it is possible that some cases of cerebrospinal meningitis, due to septicemia, may so closely simulate the epidemic disease as to be mistaken for it. In one case he has seen streptococci recovered from the cerebrospinal fluid and other organs in the body, showing the presence of an acute septicemia after injury.

Dr. Lambert said that in practically all cases at Bellevue the *Meningococcus intracellularis* had been found in the cerebrospinal fluid, and this is the pathognomonic sign. After lysol injections some patients get well and some do not. No treatment seems to be effective.

Dr. Winters, in closing the discussion, said that rashes do not occur commonly in certain epidemics and very seldom in the present epidemic. Lumbar puncture, Dr.

Winters considers suitable only for hospital practice, and he says that the diagnosis should be made by careful observation of the patient, even though it should take several hours of noting every symptom, as tenderness, the pupils, the reflexes, the skin, and other available data.

THE MEDICAL ASSOCIATION OF THE GREATER CITY OF NEW YORK.

Stated Meeting, held May 9, 1904.

The President, T. E. Satterthwaite, M.D., in the Chair.

Discussion on the Treatment of Scarlet Fever.—This was the order of the evening, and the discussion was opened by Dr. S. Henry Dessau. Scarlet fever, he said, was a disease so variable in type at different times and in different countries that up to the present time not only was the prognosis of individual cases difficult, but it was also very difficult to estimate the value of any method of treatment, unless the number of cases treated was very large. Although the disease has always been recognized as highly contagious, until recently the most general method of treatment in vogue has been empirical and expectant. The use of tincture of ferric chloride and potassium chlorate, however, foreshadowed antiseptic treatment. With a view to the lowering of high temperature and the mitigation of the disastrous effects upon the nervous system not infrequently noted in severe cases, Currie introduced hydropathic treatment, and later this was warmly praised by Trousseau. For promoting comfort and giving tone and vigor to the nerve centers, cold affusion will probably always be employed, especially in malignant cases. The cold wet-pack does not have so pronounced an effect, but may serve a useful purpose in certain cases. Hydratics, inunction of the body, and nasopharyngeal irrigation may be said to be the most valuable adjuncts to treatment up to the present time, while the importance of sanitary measures has also become generally recognized. It would seem that we are now on the eve of a new departure in dealing with this disease. The tendency of modern ideas is to follow in the line of bacteriological research, but it is unfortunate that the specific micro-organism of scarlet fever is not yet definitely known. There is good reason to infer, however, that in association with the active element of contagion, a streptococcus, by a concurrent, or as it has been called, *symbiotic*, action, is an important factor in the etiology of complications and sequelae which are the main causes of mortality. While it has been noted that streptococcus infection renders diphtheria more severe, the evil effects of this symbiosis appear to be ever more marked in scarlet fever. The two methods that are most worthy of consideration at the present time are the serum treatment introduced by Moser of Vienna in 1885, and the antiseptic treatment introduced by Arthur Wigglesworth of Liverpool, England.

Serum Treatment.—The original antistreptococcal serum used in the disease was that of Marmoreck; the one now used, called *new serum*, is that made after the method of Aronson and Moser. It has been largely employed by Baginsky and Moser abroad and to a limited extent by Charlton, of Montreal, Chittick, of Detroit, and Louis Fischer, of New York. In December, 1902, Charlton reported fifteen cases, all severe, with two deaths. In one of the fatal cases the child was in a dying condition on admission and lived but four hours; in the other the child had pneumonia on admission, and five days later, laryngeal diphtheria. In the others the results were marked and of such rapid occurrence that he thought they could be attributed

only to the serum, without the use of which he believed that all would have died. Chittick, November, 1902, reported six cases, and his results were much less favorable, one-half of them proving fatal. Fischer, March, 1903, reported two cases successfully treated in which there were glandular swellings, necrotic exudate, and high temperature. All these observers noted a hastening of desquamation as one of the results. In concluding this portion of the subject, Dr. Dessau gave the conclusions of Mackie as published in the *Lancet* of Feb. 20, 1904, and recently quoted in the *Therapeutic Gazette*. The first and last of these were as follows: (1) Antistreptococcic serum is of distinct value in a certain number of cases, and particularly when the throat lesion is severe and toxæmia is going on; (2) even in those cases in which it does no good there is no evidence to show that it does harm.

Antiseptic Treatment.—Wigglesworth's idea is to administer carbolic acid, in doses of from 1 to 6 grains (according to age), freely diluted, every two hours at the earliest stage of the disease, until the urine becomes smoky, and to continue the acid in diminishing doses until complete convalescence occurs. He began using this treatment over twenty years ago, and in a paper in the *Lancet* of Oct. 23, 1897, claimed that he had had no deaths and only three cases of albuminuria, all transient in character; while there was only one case of glandular suppuration. All other sequelæ were absent. The most interesting feature of his paper is his advocacy and practice of giving carbolic acid (in smaller doses), not only to the scarlet fever patient, but also to the well members of the family, and then allowing the freest communication between the attendants in the sick room and the other inmates of the household. This method, he claims, acts largely as a prophylactic, and in instances where the disease is contracted, it is invariably in a mild form. Wigglesworth contends that in accordance with the investigations of Flugge, and reasoning from analogy, carbolic acid has the antiseptic power of modifying the growth and development of the specific microorganism of the disease, so as to cause an attenuation of its virulence. In concluding his argument he says: "I think, therefore, that I am fully justified in my belief that carbolic acid given in scarlet fever does produce a virus capable of exciting a more benign malady, and, without having absolutely witnessed with the physical eye the attenuation of the scarlet fever bacterium by carbolic acid, I contend that the results I have obtained do by an analogical reasoning justify my assumption that such is produced, and that the bacterium so attenuated is in fact a 'vaccine' endowed with all the beneficial results that accrue from such attenuated cultivations. In full confidence of these results ensuing, I assert that isolation in scarlet fever is both unnecessary and inexpedient." He prefers carbolic acid as the antiseptic remedy because, unlike mineral antiseptics, it has no reaction effects, and, when freely diluted, is positively harmless. Gillespie, of Edinburgh, Dr. Dessau added, has shown that carbolic acid is Nature's own antiseptic in the animal economy, being elaborated in the process of physiological digestion. On account of his own large and favorable personal experience with carbolic acid, he said he was glad to have the opportunity of calling this treatment of scarlet fever anew to the attention of the profession, as the only reference to it which he had found since the original publication was in Bussey's article on scarlet fever in Keating's *Encyclopedia of Diseases of Children*. It certainly gave one the impression of a simple, safe, rational and ready method of treatment. As to the use of antistreptococcic serum, these two methods, he thought, might well supplement

each other, for in one we antagonize the action of the toxin-producing complications, while in the other we inhibit the growth of the specific germs and attenuate their virulence. The same may be said of nasopharyngeal irrigation and hydratics. Altogether, from the recorded evidence we have at hand, we are encouraged with the hope that we have at last within our means much improved methods of treating such a dreaded and fatal disease as scarlet fever.

Statistics Apt to be Worthless.—Dr. Ransford E. Van Gieson said that on account of the infinite variety of the disease statistics were of little value unless the precise conditions present were stated. It had been his fortune to pass through several epidemics of mild character; also a few of malignant type, where all treatment was futile. Here the disease was accompanied by high temperature and grave cerebral symptoms—delirium at the outset and convulsions and coma at the close. From 1800 to 1804 Graves found in Dublin a great preponderance of malignant cases, many of them terminating within forty-eight hours. From 1804 to 1837 the recurring epidemics were of a mild type.

The Use of Creosotal.—In mild cases of the disease no special remedy is required. Usually when we have put the patient to bed, regulated the diet, and ordered an occasional laxative, we have done all that is called for. In severer cases, however, this is not sufficient. Wigglesworth's record is certainly a remarkable one, extending as it does over twenty years. It is a somewhat extraordinary fact that while we have found germs for a great many diseases, the exanthemata up to the present time have baffled all research in this respect. It is still too early, therefore, to speak with any certainty as to the character of the *contagium virum* of scarlet fever. Consequently he had taken up the old idea of zymosis as a working hypothesis, for want of a better one. He had concluded this disease to be due to a degenerated enzyme, or pernicious zymogen, as the vehicle of contagion, and had always used some remedy having antizymotic power. He began early to employ sulphite of soda. He was ever ready to accept any kind of antifermentative treatment, as closely related to the bacterial aspects of the matter, and later he was accustomed to give carbolic acid in five or six drop doses. Among the ignorant particularly, however, he found it difficult to get people to use this remedy, as it was known to be a popular means of suicide. Accordingly he took up creosotal as a substitute for it, and he had obtained just as good results with this agent. It was analogous to carbolic acid in its action and, so far as he had been able to judge, produced the same effect. The urine did not become so smoky under its use as with carbolic acid, and it could be given in much larger doses. One of the most pronounced results produced by it was a rapid fall in temperature. As a diluent for the creosotal he gave liquor ammoniæ acetatis, and he believed that this had a tendency to prevent renal complications. He had had no experience with antistreptococcic serum, but, judging from the success of the use of allotropic silver in erysipelas, he thought it might prove of value.

The Treatment of Desquamation.—He could not agree with Wigglesworth on some points. He should hesitate to say that a diminished virulence could be produced by carbolic acid or similar agents. He believed, moreover, in the strictest isolation, and the disinfection of the patient himself, externally as well as internally. One of the most potent agencies for disseminating scarlet fever was the fine particles of desquamating skin. The best means to prevent this was thorough and constant inunction of the body. Personally he was accustomed to employ for this purpose a mixture

of ten tablespoonfuls of sulphur and twice as much lard, to which were added an ounce of sodium bicarbonate and half a fluid ounce of oil of eucalyptus. He could truthfully say that he had never known an instance in which the disease was contracted from a patient, properly isolated, in whose case such inunction was faithfully carried out.

Anginose Symptoms.—The throat symptoms naturally presented different varieties, and in malignant cases necrosis commenced almost immediately. In every case, however mild, he began local treatment with the following formula:

R Borax.....	3i.
Sodium bicarbonate.....	3ii.
Potassium chlorate.....	gr. xv.
Potassium permanganate.....	gr. vi.

Half a tablespoonful of this to half a cupful of water was employed as a gargle or wash for the nose and throat.

The Use of Diphtheria Antitoxin.—Dr. Thomas Darlington said that in his experience it seemed to make very little difference what treatment was employed. He had formerly made trial of Déclat's carbolic acid treatment, but had not been impressed with its value. At the present time he was accustomed to begin the treatment of all his hospital cases with large doses of diphtheria antitoxin, with a view to preventing diphtheritic complications, and he had never seen any harm from this practice. Scarlet fever patients, about the fourth or fifth day, are apt to have some diarrhea, and for this he formerly gave creosote, in liquid peptonoids or other pleasant vehicle. He had found, however, that much the best plan was to give a little calomel at the beginning of the attack, as by this means such digestive trouble could usually be avoided. The great majority of deaths occur late in the disease, and the greatest danger from sequelæ is in the light cases, because, the children having the disease so mildly, the parents do not take proper care of them. As to the use of antistreptococic serum, he had had no experience. Dr. William N. Park was at the present time engaged in an investigation of this treatment at the Willard Parker Hospital, and it was to be hoped that some reliable data might be obtained from his researches. In conclusion, Dr. Darlington stated that the Health Department had just had prepared for the St. Louis Exposition a series of charts showing the death-rate in New York from the prominent contagious diseases during the last twenty years. In these it was interesting to note that the death-rate fell very much as soon as isolation was insisted upon.

General Symptomatic Treatment.—Dr. Walter Lester Carr said that in epidemics in which the disease was of a grave type treatment was of little benefit. He had not found carbolic acid a specific, although in small doses it was useful in relieving vomiting and also diarrhea. It was also an excellent remedy when throat complications were present, and creosotal probably acted in much the same way. Inunction was undoubtedly a very valuable measure, as Dr. Van Gieson had stated. Siebert was accustomed to use ichthyol for this purpose. Personally he never hesitated to employ sponging while maintaining inunction. The varying character of different epidemics had been clearly brought out in the discussion, and, with our present knowledge, general care and the prompt treatment of symptoms as they arose, seemed to offer the best chances of success.

No Specific as Yet.—Dr. Thomas S. Southworth said there was probably no specific for scarlet fever. He thought there was no other disease in which there was so much meddlesome interference and so much in the way of proper treatment that was omitted, as in this. What was omitted might no doubt often prevent the oc-

currence of fatal complications. Our main object, indeed, was the avoidance of complications. There was great need of good nursing, and the proper care of the child could scarcely be carried out by the mother alone. Thus, the maintenance of nasal irrigation almost necessarily required the services of a competent nurse. There were three things which especially demanded attention: (1) The kidneys, (2) the ears, and (3) suppuration of the cervical glands.

Attention to the Kidneys.—An abundant supply of fluid was required to thoroughly wash out the kidneys. At the Minturn Hospital it was the practice to give a considerable amount of milk and of water alternately every two hours, and a large flow of urine was thus induced. Under this plan the number of cases of nephritis was very small. Kidney trouble was undoubtedly much less of a bugbear at present than in the old days when water was to a great extent denied the patient. Frequent saline enemata were also of great service from their diuretic action. He agreed with Dr. Van Gieson as to the practical value of remedies like liquor ammoniæ acetatis, which had a diaphoretic as well as a diuretic effect.

The Nose and Throat.—In every case of scarlet fever he thought a culture should be taken from the throat, in order to ascertain whether any Klebs-Loeffler bacilli were present. In all institutions it was a good practice to administer diphtheria antitoxin at the inception of the case, as Dr. Darlington had advocated, because in all these places the diphtheria germ was endemic. There was not the slightest danger from this procedure, particularly if the kidneys were kept flushed. Nasal irrigations were most important, in that they were irrigations of the nasopharynx. It was his routine practice to employ saline irrigations every four hours in all his cases of scarlet fever. The fluid, if some of it should be swallowed, was perfectly harmless. This measure, he believed, prevented an immense amount of toxic infection. Thus, it limited the extension of trouble through the eustachian tube to the middle ear.

The Use of Antistreptococic Serum Unphilosophical.—Dr. Henry W. Berg said there had for some time been a universal desire to secure a serum that would successfully combat scarlet fever. The first available antistreptococic serum was that of Marmoreck. It was tried here in twenty or thirty cases and then given up, as the results from it were extremely disappointing. As to the death-rate, Dr. Berg attached very little importance to this. Some years later came the Aronson antistreptococic serum, which was far more powerful. In Aronson's own cases the death-rate was about 8 per cent., a figure by no means as favorable as is generally met with in this country under ordinary methods. Then came the Moser serum, which was more powerful still. In all these we have been dealing with a serum having an action not against the germ of the disease, but against the germ which causes the complications of the disease. What should we naturally expect from a serum which counteracts the germ of the disease itself? Undoubtedly, that under its use there should be some reduction of temperature within twenty-four or at most forty-eight hours. If such a fall occurred, we would be willing to accept it as a specific. Now, as an actual fact it is observed that under the use of antistreptococic serum there is a decline of temperature about the sixth day of the disease. When it is considered that in the ordinary history of scarlet fever, without any treatment, the febrile movement terminates by lysis on the fifth or sixth day, it will readily be seen that this serum has absolutely no claim to be considered as a specific. It is a delusion, therefore, to suppose that antistreptococic serum is useful in scarlet fever.

Negative Results from Antistreptococcic Serum at the Willard Parker Hospital.—The Secretary, Dr. P. Brynberg Porter, said it had been hoped to have Dr. Park present on this occasion to give some report of his recent investigations at the Willard Parker Hospital; but, unfortunately, he was away from the city. Dr. Park had, however, informed him verbally that the results from antistreptococcic serum in a dozen cases of scarlet fever had proved entirely negative. The most he could say was, that while it had not been of benefit, it had apparently done no harm.

Carbolic Acid.—Dr. Dessau closed the discussion. In regard to the difficulty of getting people to use carbolic acid on account of the prejudice against the remedy as a poison, as mentioned by Dr. Van Gieson, he said that in a large dispensary practice, in which he constantly prescribed it, he had had no trouble on this score. It was his custom to inform mothers, not that the medicine was carbolic acid, but that it had some carbolic acid in it, and that in the diluted way in which the acid was given it was absolutely harmless. The only idiosyncrasy against the remedy which he had noted was that in a few individuals it caused vomiting. This difficulty, however, could usually be overcome if its administration were persisted in for a time. Dr. Darlington had spoken somewhat disparagingly of Déclat's treatment of scarlet fever. But this treatment, in which phenol was given by hypodermatic injection, was an entirely different matter from the Wigglesworth carbolic acid treatment. It was true that we did sometimes use carbolic acid subcutaneously in the treatment of phlegmons, such as boils and carbuncles, but the dose was never a large one—not more than 10 drops of a 10 per cent. solution. Wigglesworth, on the other hand, gave as much carbolic acid by the mouth as his patients could take.

Diphtheria Antitoxin in Scarlet Fever.—In regard to Dr. Darlington's routine practice of administering diphtheria antitoxin at the beginning of all cases of scarlet fever, it was interesting to note that in Chittick's two most successful cases the patients had given them, some time after getting the antistreptococcic serum, 2,500 units of diphtheria antitoxin, although no Klebs-Loeffler bacilli were found. On the other hand, two cases in which the antitoxin was given first, and later free doses of antistreptococcic serum, did badly; one of them dying, and the other recovering only after a month's illness.

HARVARD MEDICAL SOCIETY OF NEW YORK.

Regular Monthly Meeting, held Saturday, April 23, 1904.

The Vice-President, Eugene Fuller, M.D., in the Chair.

Modern Therapeutics.—This was the title of the paper of the evening and was read by Dr. Reynold Webb Wilcox. He said that many important advances in modern therapeutics have been made with regard to physical and mechanical methods of treating disease. These are no longer used empirically, as had been the case for so long, when their employment was rather in the hands of the quack and the charlatan, than of the regular practitioner, but are now employed on definite scientific principles. Some of the changes in the rationale of their use are extremely interesting and represent distinct landmarks in the progress of therapeutics. The cold bath, for instance, is no longer used with the idea that it reduces fever, or as a general nervous stimulant, but it is rather employed for the purpose of eliminating various toxins through the kidneys.

Climate and Mineral Springs.—Dr. Wilcox said that there has come a complete realization that there cannot be an ideal climate, since the first necessity would be equability of temperature, and this cannot exist without a dampness that is eminently unsatisfactory. The climate must not be too dry, however, for it has been learned that large and rapid daily changes of temperature must of necessity follow. With regard to mineral springs and the effect of mineral waters, modern medicine is in a much better position to know the chemical composition of these waters and what can be looked for from them and what not. Besides the chemistry of mineral waters, there has come a great advance in our knowledge of the physical chemistry of such solutions and the study of various radio-activities as are associated with mineral waters is opening up another and probably a brilliant chapter in internal hydrotherapeutics.

Electricity.—This is no longer looked upon as a cure-all, but definite indications for its employment are well recognized. The very high tension electricity, as developed by Dr. Morton in this country, and the use of high frequency currents, have made electrotherapeutics a much more important chapter and with a much more rational basis than before. The effect of electricity upon the blood vessels and the consequent stimulating effect of variations in blood pressure are now well known and show the lines in which this department is going to develop. Static electricity is no longer used merely empirically, but has a definite set of indications and can be made in proper conditions and with appropriate direction to give definite results.

Pure Drug Therapeutics.—Drug therapeutics has lagged somewhat behind physical and mechanical therapeutics as regards its establishment upon a firm rational basis. There is no doubt now that the new physical chemistry, the most brilliant chapter in chemical development at the end of the nineteenth century, will soon remedy most of this defect. Already this has been accomplished for familiar drugs and the end is not yet. At the beginning of the nineteenth century the use of all drugs was based upon empiricism. As the result of German nihilism, unfortunately there was for a time, in scientific hands, a neglect of drugs that kept therapeutics in the background, while pathology and other departments of medical science were advancing with giant strides. Even at the present time many so-called textbooks of medicine are scarcely more than treatises on pure pathology. With regard to treatment very little is said. So much is this division of the book overshadowed by the rest that often it occupies brief paragraphs where the others have pages devoted to them. This is, of course, as it should be, since a text-book of medicine must be helpful not alone in the recognition of disease, but especially for its cure, as far as that is possible and for its care if cure cannot be obtained.

Physical Chemistry of Drug Treatment.—If drug treatment is to be successful in modern days and if its true rationale is to be recognized, then the basis of the explanation of drug effects must be along the lines of physical chemistry. It must not be forgotten that at various times varying explanations for the action of a drug may be offered and accepted, and yet the truth as to its real therapeutic effect not be known until the real cause of the disease has been recognized. Until Laveran discovered the cause of malaria, it was impossible ever for therapeutists to give the true reason for the action of quinine in the disease. Much had been said about its supposed effect on fever, of its effect on the white blood cells, it was when it had been found that it acted unfavorably upon the *Plasmodium malariae* that the real explanation became evident. The empir-

ical fact of the usefulness of quinine was unsatiable. The explanations offered for its effect, however, were many and had to be changed with the progress of science until at last truth came.

Basis of Drug Therapy.—Drug therapy is now being put on a much more secure basis, by observations in the laboratory. This does not change the views with regard to the employment of remedies, but often helps to make it clear how they may be used with better effect. Digitalis is now used on a very different theory from that on which it was originally introduced, but the indications for its employment are the same as when Withering first wrote with regard to it in 1784. The most hopeful thing with regard to present-day drug therapeutics lies in the development of physical chemistry. It is but a few years since Faraday introduced the word ion and the idea which it conveys. Only now is the pregnant idea of his coming to bear fruit in a new science of chemistry. In the days when Lister recommended carbolic acid as the most important thing for securing asepsis, generally the material was employed in varied solution. However, by experiment and observation it came to be known that in oily solution carbolic acid did not inhibit bacterial growth. It was not until the application of Faraday's theory to chemical compounds brought out the fact that electrolytes are not set free when in oily solution that the real explanation for this failure of carbolic acid, under these circumstances, could be understood. The same explanation has been found to be helpful with regard to solutions of mercury, and even with regard to many biological phenomena where it might be least expected to have its application. The formation of rouleaux in the blood, that is, the clinging together in series of the red blood corpuscles, is really a phenomenon of ionization. The Widal reaction receives its best explanation on the ionic theory. The action of toxin and antitoxin on one another are phenomena of ionization. These phenomena can now be measured with exactness by the Wheatstone bridge, as was demonstrated at our last meeting, and Kohlrausch has determined the conductivity of fluids with reference to their contained electrical units. There are practical applications of these theories, as for instance the pleuritic fluids and their possible absorption and to the urinary contents that look very promising.

Pharmacopoeia.—While the profession in America had an excellent pharmacopoeia for use, one that is generally considered more valuable than that of any other nation, not even excepting the German, very few physicians have been sufficiently familiar with it. One hundred and fifty professors of therapeutics were asked why they thought the pharmacopoeia was not more used in this country. Over thirty of them answered that they considered the main reason for the neglect of the pharmacopoeia by the medical profession was its unwieldy size. It is evident that even these professors of therapeutics made the mistake of taking the United States Dispensary for the pharmacopoeia. If such is the case, Dr. Wilcox ventures to say that a very large proportion of the practising physicians of this country do not know the pharmacopoeia because they have been deterred by the supposition of its size, while it is really only a comparatively small book, yet contains, well arranged, some of the most indispensable information a physician can have who is intent on prescribing rationally without the supposed aid thrust upon him by overzealous manufacturing chemists.

Pharmacopoeial Development.—The United States Pharmacopoeia was first formally issued in 1817, when it was decided that some legal standard was required for drugs and drug preparations. Until 1840 it continued to be published in Latin and English, but since then has

been published only in English. Physicians would find that it contained nearly everything they needed to prescribe, and many helpful suggestions. Every ten years, as the result of invitations to medical schools and various medical and pharmaceutical societies, a committee of revision was selected, consisting of twenty-five members, who see to the elimination of drugs that are no longer used and to the introduction of remedial materials of various kinds, than have been introduced to medicine during the preceding decade. The book thus made is the legal standard, and is adopted by the Custom House, the Army and the Navy, as well as most of the States, as the place of last appeal for formal and legal information with regard to drugs. The next edition, which is to be issued within a few weeks, will contain besides the other information the dosage of the various drugs and remedies that are incorporated in the pharmacopoeia.

Students and Drug Therapeutics.—At a recent discussion of the American Therapeutic Society the question was asked why medical students do not know more about therapeutics, since, as a rule, most of them are anxious to learn what to do for disease and yet are graduated, without practical training in the use of remedial agents. In the course of the discussion it was brought out that there is too much teaching of the theory of treatment and too little demonstration of the practical work of drugs either on animals or on patients. Medical students must have definite courses in the action of drugs, as these can be exhibited on animals, and then may be introduced to the classification of drugs with the idea of widening their knowledge as well as of suggesting the grouping of materials related to those whose action they have seen. Then the medical profession in this country will escape the opprobrium of Dr. Holmes's satire, that they sometimes use drugs of which they know nothing for diseases of which they know less. His other expression, used more in jest than in earnest, perhaps, that 'twould have been better for men, though worse for fishes, if all the drugs jest than in earnest, perhaps, that 'twould have been better.

Simplicity of Therapy.—Dr. Charles G. Schram said, in discussing the paper, that the keynote of therapeutics must be simplicity in the use of remedies. The day of complicated methods of cure is over. One remedy is used for its definite effect rather than a gunshot prescription with the idea that something in it will touch the right spot and help the patient regardless of the effect of the rest of the drugs in the mixture. The striking expression of the distinguished professor of cutaneous diseases at Harvard who said, "use vaseline if you do not know the ointment that you want to use exactly, but do not prescribe an ointment on general principles. Use lime water, if you do not know what you consider to be the proper lotion that you should employ, instead of prescribing something of whose effect you are not sure. The human organism is very delicately balanced and drugs misapplied easily do damage. The first rule must always be *non nocere*, not to do any harm. The next must be to treat the individual, and not the affection with which he is suffering.

Teaching of Therapeutics.—Dr. A. B. Duel said, in continuing the discussion, that the teaching of therapeutics a few years ago, even in good medical colleges, was apt to be rather farcical. The professor did a good deal of reading of facts and dry lecturing with regard to drug actions until the student finally got hold of a compend, boned the matter up and passed his examination. With regard to clinical application of drugs, so little was said that the student carried away next to nothing. The professor of clinical medicine spent nine-tenths of his time in the discussion of diag-

nosis and etiology and of pathology, and said only a few brief hurried words with regard to treatment at the end. Some men who got hospital work were given a training at the hands of distinguished clinical observers, but found that their use of drugs was entirely empiric and had very little reference to the scientific drug actions, as stated by the specialist in therapeutics. At the present time a change has come over that sort of teaching. But the medical student of to-day is eminently to be pitied. He is in the midst of three fires. There is the laboratory man who wants most of his time; the professor of clinical medicine, who wants him at the bedside for many hours a day; finally, there is the specialist who considers that the only hope for practical medicine is in the devotion of more time to the specialties.

Diagnosis Versus Therapy.—Dr. Edward Foote said that the science of diagnosis was definite and sure, yet difficult and required the most careful teaching from the very beginning, if its practice were to become the routine necessary for the successful practice of rational medicine. Rightly, then, the medical schools insisted so much more on diagnosis than on treatment. Treatment is much more uncertain, varies to a certain extent from year to year, can be learned from books, as diagnosis cannot, and consequently can be neglected with more impunity, or, at least, have less time devoted to it with smaller danger to ultimate success of the practitioner of medicine.

Formularies.—Dr. Henry Spooner said that medical students are told much about drug actions, but are apt to know little or nothing about the look of drugs or the combinations of them. Hence the tendency to secure formularies and make selection of prescription. In those whose tendency is not in this line, the ready-made formulas of the manufacturing drug houses make an easy and facile resort which cannot, however, but prove serious for the practice of medicine.

Dr. Whitman said that as a graduate in medicine he had scarcely the faintest notion of practical therapeutics, and one of his earliest hospital reminiscences impressed upon him as a memorial of drug action, was the effect of various cathartic remedies. The hope of drug therapeutics, however, seemed to his mind to consist in the gradual evolution of the mechanics of drug therapy, so that their use will be established on a firm rationale.

Dr. Fuller said that students should be taught the simple effects of a few drugs, and these of course the important ones. The attempt to crowd into their brains all therapeutic knowledge inevitably swamped them with undigested information, and they had to begin for themselves by learning the action of a few drugs. Dr. Fuller believes that drug houses should be made responsible for what they put upon the market, and for the alluring advertisements, often without any basis in truth, by which they attempt to bring about the introduction of their remedies. Professors of therapeutics should impress the young practitioner, about to begin his career, with the fact that most of these much-advertised remedies are without any proper efficaciousness. Personally, Dr. Fuller has never used any of the new remedies until they have been at least five years before the public. Then time and the experience of the many, has usually sifted out those that are helpful and eliminated the useless preparations. It is interesting, however, to realize that Doctors are ever avid for ready-made prescriptions. At the Post-Graduate the announcement of a prescription is always followed by the appearance of note-books and the waking up of students in order to take it down. They are all evidently interested in getting at the details of practical medicine, but they cannot trust to their memory for the indications for drugs, making combinations for

themselves, but prefer definite formulas. This is evidently a manifestation of the same spirit that leads them to take up with the various ready-made prescriptions offered by the drug houses.

Dr. Follen Cabot said that at least physicians who have graduated should know what substances are incompatible in prescriptions. This should be true not only for the chemical incompatibilities, which, if they are serious, the druggist will usually correct or at least ask about, but especially with regard to the therapeutic incompatibilities. How often does it not happen that in a prescription in which a number of ingredients occur some of the materials have directly opposite physiological action to that of others or at least tend to modify and neutralize such action. This, of course, nullifies the value of the prescription.

Number of Drugs.—Dr. Wilcox, in closing the discussion, said that there is much more in the practice of therapeutics than the mere administration of drugs, though this seems to fill so large a space in the minds of many medical practitioners as almost to exclude other and extremely important therapeutic measures. Old customs in medicine seem to counsel not only many drugs, but very frequent administration. He remembers distinctly in hospital treatment seeing one medicine given before and another after meals, regularly three times a day, with a sleeping draught at night and a laxative potion in the morning. Altogether the patient looked to eight different times at which health-giving medicine was to be administered. Undoubtedly this had a good suggestive effect, whenever it was not undone by the action of the medicine. At the present time, however, the tendency is very fortunately toward simplicity of remedies and much less frequency of administration.

Therapeutic Successes.—Those who are discouraged with regard to therapeutics should remember some of the facts and statistics of present-day treatment. Formerly 75 per cent of patients attacked by laryngeal diphtheria died. Now between serum and intubation 75 per cent. recover. The former death rate from typhoid fever in hospital treatment was eighteen per cent. Now the mortality is not more than two per cent. As the result of the use of quinine 95 per cent. of the cases of amebic dysentery recover, though formerly this was a very fatal and persistent disease. For rheumatism Sydenham said the only treatment was six weeks and flannel. About a century ago Cullen said the only thing for rheumatism was six weeks and patience. Now with proper use of the salicylates the disease usually does not last more than six days. Without minimizing diagnosis, pathology, or etiology, it is easy to understand that treatment is more important than any of them. Diagnosis is much easier than intelligent therapy. There are certain improvements in the teaching of therapeutics, however, that should be introduced and with the present spread of laboratories and the tendency to include demonstrations in all courses in medical schools actual contact with drugs, remedial agencies and experience with their effects on animals is much more common than might be thought by those who graduated twenty years ago.

Validol in Seasickness.—K. KOEPKE (*Therap. Monatshft.*, June, 1904) believes he has discovered a specific against seasickness in validol. The patient receives ten to fifteen drops on sugar and is instructed to lie down; in almost every case the vertigo and nausea disappear and small amounts of food can be retained. If the theory that seasickness is caused by cerebral anemia is correct, validol probably acts by raising the intracranial blood-pressure.

BRITISH MEDICAL ASSOCIATION.¹

Seventy-second Annual Meeting, held at Oxford, England, July 26, 27, 28 and 29, 1904.

(Continued from Page 327.)

Army and Navy Service.—The president of this section, Surgeon-General Bradshaw, made a few appropriate introductory remarks commenting on the great importance of the hints that meetings of this kind give to the profession and also of the striking benefit to the soldier and sailor as a result of these conferences.

Camp Sanitation.—Major C. E. Freeman said that the sanitation of camps is a subject of vital importance to all, whether representing the navy, army, or volunteers. Camps in war time fall into two divisions: temporary and standing camps. The tendency nowadays is to replace temporary camps—that is, those occupied for twenty-four to forty-eight hours only—by bivouacs, doing away with tents altogether when on the march. As far as experience goes, at any rate in South Africa, the results of this procedure were good. The men seemed to get quickly hardened to the open-air life, while the relief to the transport was, of course, enormous. With the increased celerity of movement demanded by modern tactics on the march, the bivouac will in future always replace the camp. All that can be done in these hasty encampments and bivouacs is to apply the due principles of camp sanitation as far as time and means at disposal will permit. Owing to the shortness of the halt there is no great likelihood of infection arising, and if steps be taken to keep the source of the water supply clean, to prevent the actual ground occupied by the troops from being fouled, to dig a latrine trench and rubbish pit in a suitable position, and to cover in the trench and set fire to the rubbish on departing next day—that is as much as he can accomplish. If other troops following after occupy the same ground, danger arises, and great stress should be laid on the importance of using fresh sites wherever possible to encamp on. The principles of camp sanitation find their chief application in the standing camps, which are a necessary and important feature of every campaign. It is here that sickness and epidemic disease usually break out—seldom among troops who are on the march. Looking broadly at the problem these camps are congested areas, often with populations of 20,000 to 30,000 inhabitants, and having a minimum density of population in the infantry regiments of 226 men to an acre, which is greater than that of the most crowded part of Whitechapel (Notter and Firth). This crowded community has a ready-made water supply, drainage system, abattoirs, or scavenging arrangements. The inhabitants are crowded in their tents to an extent never met with in civil life, and have but small facilities for personal cleanliness. They are often worn out by fatigue and privations, or wearied by home sickness and the deadly monotony of military routine. It is to be wondered that when infectious disease breaks out in these circumstances it tends to spread like wildfire. Owing to the complexity of the problem the precautions called for must be somewhat elaborate, and it will be best to touch lightly on each point in succession, speaking in more detail on the questions which are the chief subject of this paper.

Tents.—There is nothing to be said in favor of the bell tent, and a ridge-pole tent is now being introduced which seems better in every way. A similar form of tent has been adopted in India. It is needless here to

expatiate on the evils of overcrowding in the tents, and on the advantage of disposing the camp as widely as possible. Animals in camp should be picketed as far from the tents as circumstances will permit, as they of necessity foul the ground and attract flies. The usual arrangement with cavalry, artillery, etc., of having the horse lines in the center of the camp may be necessary for military exigencies, but it is bad sanitation.

Water Supply.—This is a burning question. The important point is to secure if possible a decent source of supply, and to take every care to keep it uncontaminated. This is far better than taking water at haphazard—very possibly with a dead camel or horse lying by—and trusting to boiling or filtration afterwards; for the more the water is handled the more likely it is to be infected, and the dirtier it becomes, while great care and supervision are required in its storage. Therefore a resort to boiling or filtration unless certain that the water was impure is not advisable. To this rule, however, one exception should be made. Cholera is so greatly a waterborne disease, that if an outbreak of it were dreaded, as a precaution all the drinking water should be boiled or filtered. Of these two modes one would recommend boiling, as the Pasteur or Berkefeld filters are rather delicate mechanisms to handle in the field. Boiled water as weak tea would soon become a fairly popular beverage.

In a standing camp a system of elevated cisterns can often be improvised, thus doing away with the frequent movements of water carts, and ensuring the maximum protection to the water.

Food.—The question of rations does not concern us here, but the field kitchens do, and much care is required to keep them clean and so to prevent a plague of flies. The great point is to teach the cooks to put all the fragments of food, etc., into empty tins, and not to throw everything on the ground and trust to sweeping it up afterward. If this is allowed, the ground quickly becomes foul and a center of attraction for flies. All organic rubbish must of course be burnt in the kitchen fires. There is a curious tendency in camps, which we have to fight against, to put the kitchens and latrines close together. The medical officer must see that they are kept as far from each other as possible, otherwise flies of course pass from one to the other and the food is infected.

Latrines.—These are the crux of camp sanitation, especially when viewed in the light of recent discoveries as to the rôle played by flies in the spread of disease. In standing camps latrines are of two patterns, either the trench or the pail system. The latter is much to be preferred, as trenches rapidly get filled up and fresh ones have to be dug, thus continually extending the danger area; while under the pail system the excreta are removed away from the camp altogether. This pail system can, of course, only be carried out in favorable circumstances and in camps of a fairly permanent nature. The buckets must be in good order and sufficient in number. The soil carts must be efficient and perfectly watertight, and the pits where the excreta are disposed of must be situated well away from the camp, and the water supply must be dug not too deep or too large, and be regularly filled in daily. An adequate staff of scavengers must be provided, and careful and regular supervision of all these details by a medical officer will be required. Unless all these requirements can be complied with the pail system is better not attempted, as the buckets will be foul, sewage will be dropped about the camp and the night-soil pits will become a filthy morass. If fresh chloride of lime is available, some may be thrown into the trench with the dry earth.

¹ From advance sheets of the *British Medical Journal*, by courtesy of the editor.

It has bactericidal properties and its odor discourages flies. Lime is useless, as are all disinfectant powders. Pioneers must be detailed to take charge of the latrines, otherwise the trenches and their surroundings speedily become foul in the last degree. Screens must be improvised, not only for decency but also to prevent wind and dust storms blowing the dried excreta, etc., about the camp—a common and obvious source of infection in India and South Africa.

Sanitation in Volunteer Camps and the Disposal of Refuse and Excreta.—Surgeon-Lieutenant-Colonel P. B. Giles said that a powerful factor against efficient sanitation in volunteer camps is that the general system of laying out the camp is left to the quartermaster and adjutant and to the entire exclusion of the medical officer, and so frequently the best sanitation is not secured. It is quite true that volunteer camps are only intended to be used for a short period by the various units camping; but as it so frequently happens favorite localities are used year after year more or less all the summer, and so get foul, and because the purpose of camping is to give practical instruction, it has always seemed to me that as the dangers of camp life to a great extent are the diseases that are preventable, the proper course would be to start with all the precautions that should be observed if the conditions were actual service against a foe.

First, he considers that any attempts to restrict and curtail the area of a camp are risky; cramping the area of a camp may not under other favorable conditions at once show anything unhealthy, but experience goes to amply prove that in all localities in which camps are formed, and continued, that certain diseases will sooner or later occur, generally in the inverse ratio of the period over which the ground is occupied, and therefore all attempts to curtail the area of a camp and so concentrate humanity will result in sickness. Secondly, that the illnesses peculiar to camp are *de facto* such as are common to those who live in crowded and ill-ventilated localities—namely, diarrhea, sore throat, rheumatism, conjunctivitis, pneumonia, dysentery, simple continued fever, enteric. Thirdly, that the best way to prevent these diseases of camp is to obtain the best ventilation, cleanliness, disposal of refuse, disposal of excreta.

Bell tents he considers very unsanitary. The new double tent has its drawbacks, in that it lessens the germicidal activities of the sun's rays. He is not in favor of the water bottle. It is difficult to keep clean. Is more frequently used for beer. Becomes infected readily, and is not conducive to that all-important feature of military life—thirst control. Earth pail latrines he thinks better than trenches. All refuse should be burned.

Naval Dietary.—Staff Surgeon J. Falconer Hall said that the new scale of dietary came into force October 1, 1903, and since then one has had time to form an opinion regarding it. In discussing the question of naval dietary one has always to remember that compensation (or savings, as it is called) is allowed for certain articles of food that are not taken up, and much of this money is spent in the ship's canteen on various other foodstuffs. A short review of the different articles of diet is here given:

Soft Bread.—This is supplied at all the home ports, as well as most of the ports abroad, and is of a very good quality, though now and then, especially abroad, an increase in the amount of crust would be an improvement; two-thirds of the bread must be taken up.

Biscuit.—This ration is issued when the ship is at sea. It is a very popular ration, and from its composition

it will be seen that its nutritious value is very high.

Fresh Meat.—The meat supplied to the service is of very good quality, being especially so at home ports. Where fresh mutton can be procured at a reasonable price, it may be issued as a change, if the men desire it. In any case, two-thirds of this ration must be taken up.

Fresh Vegetables.—The vegetables may consist entirely of one kind, or of various kinds. At home ports, potatoes are very often supplied, with frequent changes to fresh green vegetables. Abroad, the fresh vegetables issued depend almost entirely on the part of the world where the ship may be. This ration is only issued with fresh meat. In most ships potatoes are part of the canteen stock, where they can be purchased by the men.

Spirit.—An $\frac{1}{2}$ pint of rum is issued to warrant officers and men over the age of 20. This is served out immediately after dinner. Savings may be taken for this ration, or the following substitutes: (1) $\frac{1}{4}$ oz. tea, $\frac{1}{2}$ oz. soluble chocolate, and $1\frac{1}{4}$ oz. sugar; (2) $\frac{1}{4}$ oz. tea and $2\frac{3}{4}$ oz. sugar, or (3) $\frac{1}{4}$ oz. soluble chocolate, and 2 oz. sugar. The Admiralty also allow $\frac{1}{2}$ a pint of wine, or 1 pint of porter, as the equivalent of the $\frac{1}{2}$ pint of rum. Porter is usually only issued in ships on the West Coast of Africa.

Jam.—The jams supplied consist of the following descriptions, namely, strawberry, black currant, apricot, plum, gooseberry, and orange marmalade. Marmalade is issued at least on two days a week; the other days of the week the men have their choice, but only one variety is issued on any one day. In the ship one is in at present very little of the jam is taken up; but one is quite sure that in a foreign station all of it would be taken up.

Condensed Milk.—This is of the unsweetened description. No savings are allowed for this article; this is a very good thing, as it can be used for tea, or to make puddings, etc.

Compressed Vegetables.—These consist of several kinds, namely, mixed vegetables, haricot beans, shredded beans, cabbage, carrots, onions, sliced potatoes, and spinach. These are to be issued as far as possible in the varieties that the men like. The following rules have been framed for the cooking of these vegetables. The vegetables are to be placed in a small meshed net and taken to the cook the night before, who will soak them properly in hot water; this is a most important point, and the water should be changed several times during the process. The next morning the vegetables will be steamed by being placed on special gratings fitted to the coppers.

Preserved Potato.—This ration has been done away with, and a very good thing, as it was never palatable, and could really only be used for thickening soups.

Tea, Cocoa and Coffee.—The new scale provides for one ration of cocoa, one of coffee, and two of tea. At present very little coffee is taken up; this will no doubt increase as the men get to know how to make it properly. At present tea is the most popular beverage; it is now issued to each mess, and the men can make it as required. Cocoa is always issued the first thing in the morning; the men are very fond of this ration.

Preserved Meat.—This ration, for dinner or supper, consists of corned beef, boiled beef, or boiled mutton. This is issued in the kinds preferred by the men as far as possible. Corned beef as a rule is the favorite.

Salt Pork.—This is a very popular ration, and all the issue is usually taken up.

Salt Beef is of a very good quality, but is not so much liked as the pork.

None of the other articles of dietary require any special notice.

(To be Continued.)